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Guayule Extraction Mill

First Factory in United States to Process New American Farm Product, Starts Work on West Coast

IN THE presence of a large assembly of representatives of rubber, chemical, agricultural, railroad, educational, engineering, and other interests from all parts of the country, the formal opening took place on February 6 of the $150,000 guayule extraction factory just erected near Salinas, Monterey County, California, by American Rubber Producers, Inc., a subsidiary of the Intercontinental Rubber Co. George H. Carnahan, president of the latter and its subsidiaries, was host and master of ceremonies, and, aided by Vice President William H. Yeandle, conducted the guests through the factory, the nursery at Salinas where 25,000,000 little shrubs are growing, and many of the fields of planted guayule in the environs.

The new factory is located at Spence Siding on the Southern Pacific Railway nearly ten miles south of Salinas, the focal point of the new guayule industry, and it is designed primarily to take care of the plantings made on nearly 7,000 acres within a twenty-five-mile radius of Salinas. Its first job is to process the product of some 800 acres which are now yielding their matured four-year-old crop of plants, and then it will take care of a minimum product of 2,000 acres of guayule coming to maturity each year.

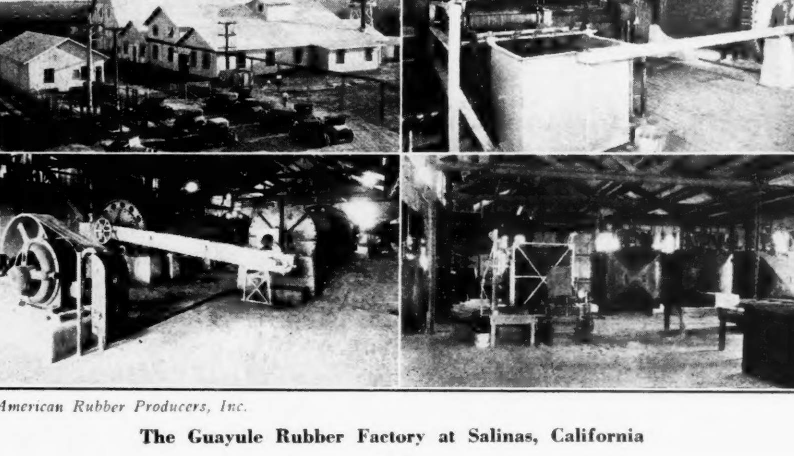
The plant will have an initial capacity of 15,000 pounds of dry rubber daily. The raw material is yielded by unirrigated plants now growing on the lighter upland soils of

The Plant

Milling

Refining

Drying



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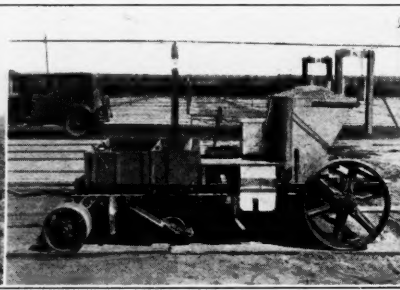
The Guayule Rubber Factory at Salinas, California



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Gathering Guayule Seed **Sowing Seed in Nursery** **25,000,000 Seedlings**

Salinas Valley, hitherto used for a marginal production of beans and barley. The newest development represents the outlay of $2,000,000 and culminates twenty years of unceasing research and experiment in the development of the guayule plant.

Last Word in Efficiency

The new factory is modeled after the four factories owned by a sister company in Mexico; the chief one is at Torreon, State of Coahuila, the original capacity of which was 800,000 pounds monthly. The California factory not only embodies the best features of the Mexican works but has many added advantages for the more efficient mechanization of the final process.

In the first step screw conveyers take the chopped shrub out of storage at a predetermined rate of 4,000 pounds (bone-dry weight) an hour, automatically and continuously feeding it to heavy macerating rolls, which in turn feed a train of four large tube mills, in the first of which water is added. These mills contain flint pebbles, and their function is to grind up and water-log the woody fiber, break down the rubber containing cells of the cortex, and agglomerate the minute sponges of rubber into aggregates the size of a grain of wheat.

When discharged from the fourth mill, the pulp is washed, diluted with fresh water, and continuously fed to an automatic flotation or separation tank in which the rubber and cork float and the water-logged fiber sinks. Both products are continuously and automatically removed from the tank; the contaminated rubber goes to high-pressure hydraulic chambers into which water is forced under 350 pounds to cause the non-rubber material to sink in the separation tank that follows.

How Rubber Is Washed and Caked

After settling out the bark, the floating rubber is continuously conveyed to another tube mill where the "rubber worms" are again scrubbed with rubber-covered lead balls which remove the last trace of dirt. After dewatering on rubber covered wringers, the wet worms are continuously conveyed to large metal trays each holding 35 pounds (dry weight) of rubber. When twenty-two of these are accumulated on roller equipped racks, they are mechanically put into a vacuum drier chamber. The output of these driers carries about 1 per cent moisture, and the spongy rubber is accumulated in charges of exactly 200 pounds in the press-box of an hydraulic press, where it is blocked under 2,500 pounds' pressure into cakes which fit staunch wooden cases for carload shipment to consumers.

Up to the present, final processing of the plant product was done under experimental conditions in the laboratory adjoining the nursery. The chief concern of the technicians was whether they would get equally good and exact results, if not better, in the new mill designed for commercial production. The results of the initial mill-run are said to be very gratifying, both in regard to quality and percentage obtained.

How Crops Are Developed

At the nursery the minute ripe seed of a strain of plants proved to be thrifty and high rubber yielding are picked with a vacuum cleaner mounted on a light car passing over long rows of plants. The machine in one day will accumulate enough seeds to supply plants for one hundred acres. This apparatus and all others used in planting and harvesting have been especially designed by the company's engineers.

Next the seeds are specially treated to insure germination and are sown in machine prepared nursery beds 4 by 180 feet; each bed produces 24,000 plants or enough for three field acres. One tractor drawn seeder plants one hundred such beds in four hours while rolling in a light sand covering. In California this work is done in April and May. During the summer the plants are watered by an overhead spray system; three men take care of one hundred beds. In February the plants are topped to within an inch of the ground, dug, and sorted, all with special machinery. Packed in boxes the plants are trucked to the fields where a tractor-

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Six-Row Transplanter **Six-Row Cultivator** **Guayule Shrub Digger**

drawn planter sets them out on evenly spaced 28-inch corners at the rate of 160,000 a day on twenty acres and six rows at a time.

Simplifying Four Years' Work

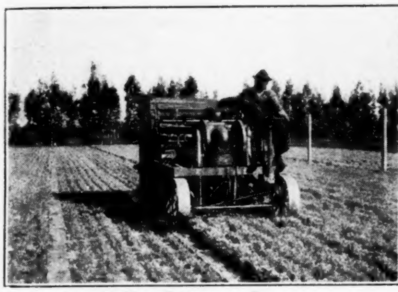
For the next four years it is necessary only to chop down the competing weeds, and in this work special six-row one-man cultivators are used, covering five acres an hour. The check row planting permits cultivation in both directions with the same equipment; and early in the third year the plants are large enough to shade out the weeds. When the plants are nearly four years old, they are uprooted to a depth of ten inches with a two-row tractor-drawn digger. After machine-beating to free the roots from adhering soil, they are left partially to dry in the field in windrows of four rows each.

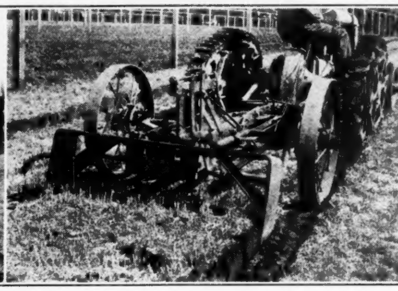
The plants are then picked up by a special tractor-drawn outfit that chops them into ½-inch sections and blows the chopped material into trucks and trailers that move across the fields with the chopper, next proceeding to the factory storage bins which are served with an elevator and automatic distributing belt.

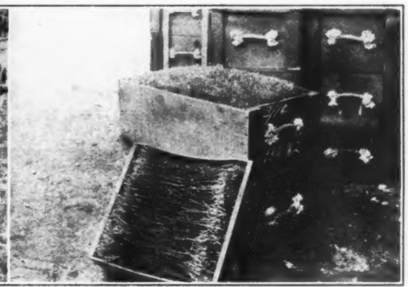
Present and Potential Uses

Up to the present, it is stated, most of the available guayule rubber has been used in coating or frictioning the cotton cords used in building tire casings, but it has also a wide and proved field of usefulness for inner tubes and as a plasticiser of tire tread stocks. It is estimated that these uses would take care of an annual output of 100,000,000 pounds, or 10 per cent of normal United States rubber consumption; and beyond this partial or total deresination would be employed to widen the field.

From a chemical and physical standpoint the guayule behaves exactly like standard Hevea rubber, but in the mechanical method of extraction certain "resins," also carried by the plant, are incorporated in the product, although in such form there is a ready market for much more than has ever been produced. Methods have been fully developed by the company's chief technician, Dr. David Spence, to remove these impurities whenever there is a commercial incentive to shrink correspondingly the weight.[1]







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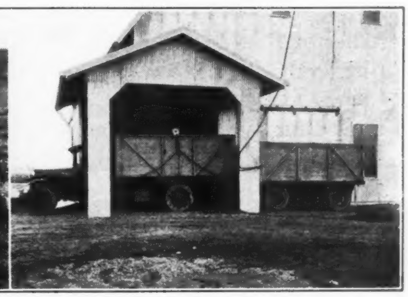
Topping Nursery Seedlings **Digging Seedlings in Nursery** **Seedlings Packed for Shipping**

Acknowledgment

In addition to Drs. Spence and McCallum, chief botanist, Mr. Carnahan has been notably aided in the Salinas operations by General Manager J. Miller Williams and Vice President Frederic W. Taylor.

[1] United States Bureau of Standards Bulletin No. 353, Sept. 23, 1927.



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Shrub Root Cleaner **Guayule Harvester** **Delivering Shrub to Factory**

Mirrors Will Bounce, Not Break

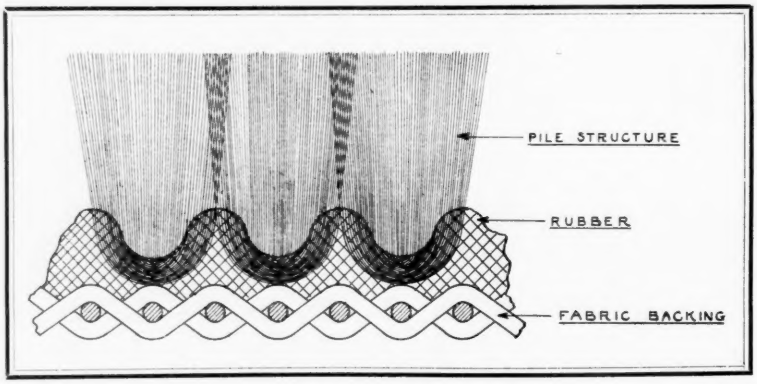
SUPERSTITIOUS folk who fear ill luck through the breaking of a looking glass will have less to worry about when the new rubber mirrors get into commercial production. Such reflectors are being made by Drs. C. H. Cartright and J. Strong, of the California Institute of Technology, Pasadena, Calif., by electrically depositing on a smooth sheet a coating of platinum, tungsten, or seventeen other elemental metals and seven non-metals and alloys, in a vacuum under a glass bell jar. The "silvering" substance set between the electric terminals is literally evaporated by the heat and converged upon the rubber or other material employed, imparting a thickness varying from one to many million molecular diameters, as desired. Next by a similar process an exceedingly thin film of quartz is deposited on top of the "silvering" to make the latter untarnishable.

Mirrors thus made have lately been substituted for the common type with which Dr. A. A. Michelson has been having trouble in his mile-long vacuum tube with which he has been testing the speed of light at Irvine, Calif.

Liquid Rubber and Carpets[1]

Leacarpet, Unique in Construction, Economy, and Durability

Webster Norris



Section of Lea Fabric Construction

THE discovery that rubber can be dispersed in water, and the invention of the means for doing it was recorded in this journal[2] from data supplied by the laboratory of the inventor, William B. Pratt. During the intervening period continuous development of the technology of the process has established it as a commercial success. As a result some notable applications of rubber dispersions have been made, and others are in progress, improving and cheapening old applications of rubber and introducing new uses.

In the latter respect one of the greatest advances in the carpet industry in a century has been accomplished by the employment of water dispersions of rubber in making Leacarpet. As ordinarily made, the plush effect of a pile carpet is obtained by interlocking the pile yarns in the woven structure. The new construction entirely eliminates spinning and weaving and produces a carpet with a texture and appearance that places it in a class with the finest chenille and the best worsted Wiltons.

LEACARPET COLORS

Ashes of Roses	Dark Green	Maroon
Burgundy	Gray	Medium Taupe
Cherry	Jade	Navy Blue
Dark Blue	Light Taupe	Nile Green

The new carpet seems assured of popular interest and adoption because it combines artistic merit with the appeal of low cost and durability in hard service. It is claimed that the goods will, in fact, outwear any competitive type and it is virtually indestructible under ordinary conditions.

The carpet is made by a continuous process in a patented machine of special design. The component parts of the construction are: (1) a backing of heavy burlap to one side of which is applied a substantial layer of dispersed rubber composition; (2) a bat of carded hair or vegetable fiber from which the pile is formed by special process; (3) an anchqrage coating of sprayed rubber dispersion that binds the bottom bends of the pile loops and surfaces them for a vulcanized union with the rubberized burlap backing or base.

This construction is made on the previously spread burlap in a machine, the first section of which receives loose, cleaned, and dyed live goat hair, which is automatically weighed, carded, and built up into a trimmed bat. At this point the bat is looped, and rubberized by a spraying mechanism. It proceeds to pressure contact with the prepared burlap. Heat is applied as soon as this contact is made, and vulcanization is effected continuously with the onward progress of the construction. After vulcanization the carpet is finished by shearing and brushing the pile.

The bonding of the pile to the back is so thoroughly effected by the rubber component that the carpet cannot ravel. It may be cut to fit any irregularity of floor line; yet the surface does not scuff up, mottle, or mark in service. The carpet is made in widths up to 10 feet. Any desired broad loom seamless effect can be obtained because the butted edges of each breadth are rendered permanently invisible by being joined securely on the back by strong adhesive strapping. The use of seam strapping permits the carpet to be laid with borders or inserts of colors chosen from the standard list of 24 stock colors available. Twelve of these colors are listed in the tabulation, the remainder comprise various tones of those named.

The method of construction admits of any desired density and height of pile, thus imparting the pleasing effect of richness and the luster and sheen characteristic of this type of fabric. The animal fibers of the pile are so firmly anchored that they can scarcely be pulled away from the base. This feature ensures great durability of the fabric as proved by the fact that it withstands the severe service encountered on the floor of the driver's compartment of an automobile without heel plates. As automobile floor covering, the carpet is held in place by a snap device. It gives a warm comfortable footing and withstands indefinitely wear and cleaning.

Sanitation is carried to the ultimate in this carpet, which is at once attractive, non-odorous, inexpensive, and comfortable as a floor covering in rooms and motor cars.

Under the designation of Leagrass it is highly successful for indoor golf courses. In fact the pile very successfully simulates fine grass. By a special testing machine which gives a putt with both constant impetus and direction, it has been proved that a golf ball rolling on Leagrass will always go exactly the same distance and in precisely the same direction without deviation or drift as it will on perfectly kept greens.

The invention of this unique carpet is but one instance of progress in liquid rubber technology that is revealing new and hitherto impossible uses for rubber, besides economies in old applications.

[1] Data from Lea Fabrics, Inc., 768 Frelinghuysen Ave., Newark, N. J.
[2] "Water Dispersions from Rubber, Balata, and Gutta Percha," Parts I to IV. John B. Tuttle, INDIA RUBBER WORLD, Jan., Feb., and May, 1923; Jan., 1924.

Evaluating Gas Blacks
by the
DPG Adsorption Method

I. Drogin, Ph.D.[1]

The testing of gas blacks for DPG adsorption value has been studied by various investigators in the past. This discussion deals with a further analysis of the principles involved and points out a definite procedure for applying the test.

THE evaluation of gas blacks for use in the rubber trade is of extreme importance both to the manufacturer and the user of this product. Thus far the only reliable test which could be viewed with confidence was that in which the black was compounded with a rubber stock according to a definite formula, and physical data obtained on the cured stock. A comparison of the stress-strain data was then made. The disadvantage of a compounding test is the time factor. If the results are to mean anything, the test must be conducted in a prescribed period of time: one day for the compounding, another day for the curing, and the third day for obtaining the physical measurements. To the gas black manufacturer whose operations are continuous throughout the 24 hours, likewise to the tire manufacturer who cannot very well permit a tie-up in his processing, the question of time is important.

For this reason a test for evaluating gas black has been developed which may be performed in several hours' time. It requires no costly apparatus in the procedure, and the results are reasonably accurate. This method is based on the principle of adsorption. It is a well-known fact that some blacks will cure faster than others. The cause has been attributed to the adsorption of the accelerator by the black. Part of the accelerator is rendered inactive, thereby affecting the physical properties of a stock which has been compounded according to a perfectly balanced formula. Not all gas blacks adsorb the same accelerators to the same degree, nor different accelerators equally.

A practical adsorption method must be such as to take care of the following important factors: 1. A solution should be employed containing a commonly used accelerator. The solubility of this accelerator should not be limited to a narrow range of solvents nor to a slight extent in each. 2. Sensitivity. If the blacks are different, the adsorption results should indicate this sharply. 3. Workability. The procedure should be easy to follow. After an extended investigation an adsorption method has been developed which embodies these features whereby results are obtained so that different gas blacks can be satisfactorily evaluated.

Outline of DPG Adsorption Method

Briefly, the method involves the shaking of two grams of black with 100 cc. of six different normality solutions of diphenylguanidine (DPG) in methanol (a pure synthetic wood alcohol), then centrifuging the mixture, and finally titrating three ten cc. portions of the supernatant liquid with corresponding normalities of hydrochloric acid in methanol, using brom phenol blue as the indicator. All calculations are expressed volumetrically in terms of a single normality hydrochloric acid. The relationship between the amount of DPG (X) adsorbed by the black and the amount of DPG (A-X) remaining in solution (all in terms of hydrochloric acid) is put in graph form—X values as ordinates, A-X values as abscissas. A curve is obtained. When this relationship is expressed in logarithmic form, a straight line is obtained. The distance between the axis of abscissa and the point of intersection of this straight line with the axis of ordinate is determined graphically. This distance corresponds to the logarithm of a constant K. The anti-logarithm is the value of this constant which may be used to evaluate gas blacks.

Mathematics of Adsorption

For those who may be interested the following mathematical explanation is given on the adsorption phenomenon:

$$X \div M = kC^{\frac{1}{P}}$$

where X = weight of DPG adsorbed.
M = weight of adsorbent, i.e. of the black.
X ÷ M = weight of DPG adsorbed by M grams of black.
C = final weight of DPG in the solution after adsorption.
k and P are constant.

This may be expressed in another form.

$$X \div M = k\ [(A\text{-}X) \div V]^{\frac{1}{P}}$$

where A = original weight of DPG before adsorption.
V = volume of DPG solution used in the test.

Either formula is purely empirical. It can be used satisfactorily between narrow limits of concentration.

The logarithmic form of

$$X \div M = kC^{\frac{1}{P}}$$

is

$$\log X - \log M = \log k + \frac{1}{P} \log C$$

$$\log X = \log M + \log k + \frac{1}{P} \log C$$

Since M is constant, therefore

$$\log X = \log K' + \frac{1}{P} \log C$$

where

$$\log K' = \log k + \log M.$$

[1] Chief chemist, Pigment Division, J. M. Huber, Inc., New York, N. Y.

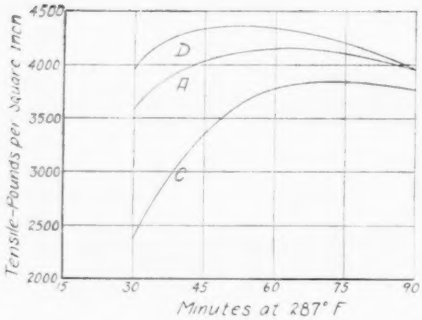


Fig. 1. Tensile Strength Curves of Gas Blacks D, A, and C

The logarithmic form of

$$X \div M = k\,[(A\text{-}X) \div V]^{\frac{1}{P}}$$

is

$$\log X - \log M = \log k + \frac{1}{P}\log (A\text{-}X) - \frac{1}{P}\log V$$

$$\log X = \log M + \log k + \frac{1}{P}\log (A\text{-}X) - \frac{1}{P}\log V$$

Since M and V are constant, therefore

$$\log X = \log K + \frac{1}{P}\log (A\text{-}X)$$

where

$$\log K = \log M + \log k - \frac{1}{P}\log V$$

Both final logarithmic equations

$$\log X = \log K' + \frac{1}{P}\log C$$

and

$$\log X = \log K + \frac{1}{P}\log (A\text{-}X)$$

are equations of straight lines where $\frac{1}{P}$ represents the slope (i. e., the tangent of the angle between the line and the axis of the abscissas), and the constants log K and log K′ represent the distance between the axis of abscissas and the point of intersection of the line with the axis of ordinates.

Significance of K Value

How should the K value be interpreted as evaluating a gas black? For the purpose of demonstrating the value of this test, we selected four different gas blacks and determined for each the stress-strain data, likewise the K value from a DPG adsorption test. The stress-strain data were obtained on stock compounded according to a widely used laboratory formula, which contained DPG as the accelerator: viz.,

Ingredients	Parts by Weight
Rubber	93
Sulphur	5
DPG	0.7
Stearic acid	2
Zinc oxide	5.6
Arrow gas black	36.4
	142.7

A comparison of the stress-strain data for the four gas blacks are shown in Table 1. Figure 1 shows the tensile strength curves of three of the blacks. Figure 2 shows the stress-strain curves of the 45- and 60-minute cures for two of the blacks. Table 2 compares the stress-strain data with K values actually obtained with the corresponding gas blacks. These results indicate that a lower K value is shown by a faster curing gas black and by a gas black which will give a higher modulus and a higher tensile.

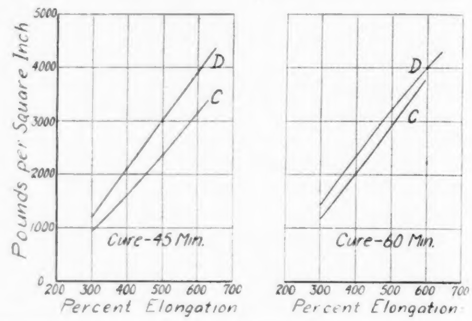


Fig. 2 Stress-Strain Curves of Gas Blacks D and C

TABLE 1

STRESS-STRAIN DATA OBTAINED ON STOCK COMPOUNDED WITH FOUR DIFFERENT GAS BLACKS

Cured in Press at 40 Lbs. Per Sq. In. Min.	Load at 300% Elong.		Load at 500% Elong.		Tensile		Per Cent Elong. at Break
	Lbs. Per Sq. In.	Kg. Per Sq. Cm.	Lbs. Per Sq. In.	Kg. Per Sq. Cm.	Lbs. Per Sq. In.	Kg. Per Sq. Cm.	
			C-GAS BLACK				
30	675	48	1,900	134	2,380	168	580
45	925	65	2,350	166	3,360	237	625
60	1,175	83	2,900	204	3,780	266	595
75	1,300	92	3,025	213	3,840	271	585
90	1,375	97	3,000	211	3,775	266	570
			B-GAS BLACK				
30	620	44	1,880	133	2,760	195	610
45	900	63	2,400	169	3,440	243	620
60	1,150	81	2,700	191	3,740	264	620
75	1,200	85	2,900	205	3,880	274	600
90	1,220	86	2,975	210	3,880	274	575
			A-GAS BLACK				
30	810	57	2,250	159	3,720	262	680
45	1,025	72	2,550	180	3,900	275	650
60	1,210	85	2,900	205	4,160	293	625
75	1,420	100	3,250	229	4,100	289	595
90	1,500	106	3,300	233	3,960	279	565
			D-GAS BLACK				
30	900	63	2,350	166	3,960	279	680
45	1,200	85	3,010	212	4,380	309	650
60	1,440	102	3,220	227	4,300	303	640
75	1,700	120	3,600	254	4,200	296	580
90	1,740	123	3,800	268	3,960	279	555

TABLE 2

COMPARISON OF K VALUES WITH SUMMARY OF STRESS-STRAIN DATA FROM TABLE 1

		Maximum Tensile			60-MINUTE CURE					
					Modulus at 300% Elongation		Modulus at 500% Elongation		Tensile	
Gas Black	K From DPG Adsorption Test	Optimum Cures In Min.	Lbs. Per Sq.In.	Kg. Per Sq.Cm.	Lbs. Per Sq.In.	Kg. Per Sq.Cm.	Lbs. Per Sq.In.	Kg. Per Sq.Cm.	Lbs. Per Sq.In.	Kg. Per Sq.Cm.
B	6.72	75-90	3.875	273	1,150	81	2,700	190	3,740	264
C	6.72	75	3,840	271	1.175	83	2,900	204	3,780	266
A	5.01	60	4,160	293	1,210	85	2,900	204	4,160	293
D	4.11	45	4,360	307	1,440	101	3,220	227	4,300	303

DPG Adsorption—Test Procedure

1. Chemicals Required. Diphenylguanidine (DPG); methanol (pure synthetic wood alcohol); hydrochloric acid; brom phenol blue.

2. Preparation of Solutions.

A. DPG Solutions of Different Normalities. A normal solution of DPG will contain 211 grams DPG per liter. Prepare six solutions of DPG in methanol of the following normality:

Normality	Grams DPG Per Liter
.0025	0.5275
.0050	1.0550
.0075	1.5825
.010	2.1100
.015	3.1650
.020	4.2200

B. Hydrochloric Acid Solutions. Prepare six solutions of hydrochloric acid in methanol corresponding in normality to the DPG solutions.

Normality	Grams HCl Per Liter
.0025	.0911
.0050	.1823
.0075	.2733
.010	.3646
.015	.5469
.020	.7292

C. Indicator. Use 0.1 gram brom phenol blue in 100 cc. grain alcohol.

3. Comparison of DPG Solutions in Terms of Hydrochloric Acid. Titrate three 10 cc. portions of each DPG solution against the corresponding acid solution, using five drops of the brom phenol blue indicator, and establish the value of each DPG solution in terms of hydrochloric acid. The end point is taken when the solution turns yellow. On adding the indicator the solution turns blue. Close to the end point it turns green and at the end point yellow.

4. The Gas Black Sample. The gas black sample should be in finely divided form without lumps. It is best to brush the black through a 40- or 60-mesh screen. Two grams each are used for every DPG solution in the test. It was determined by experiment (see Table 3) that it was inadvisable to use less than two grams of black in the test. The reason is as follows: With a high (.02N) DPG solution the 10 cc. titration results for different blacks are so close that they are insufficient to magnify the difference between the blacks. When considerably more than two grams of black are used, we find that with a low (.0025N) DPG solution the adsorption reaches that point where the titration results show almost complete adsorption. This is undesirable since here again the difference between the blacks is not marked. For instance, note the close similarity in the DPG numbers for the three blacks. The selection of two grams of black for the test is apparently safe to work with.

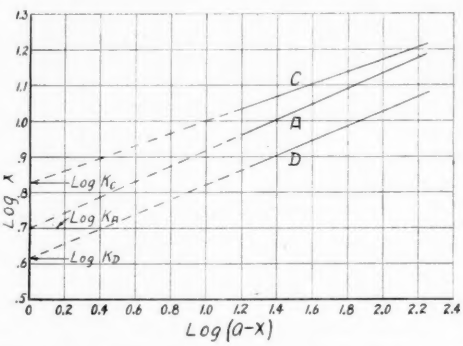


Fig. 3. Logarithmic Graphs of DPG Adsorption Curves of Gas Blacks C, A, and D

TABLE 3

ADSORPTION DATA

Weight of Black, Grams	A	A-X	X	DPG No.	A	A-X	X	DPG No.
	Normality DPG Solution = .00236 (10 cc. = 9.45 cc. N .0025 HCl)				Normality DPG Solution = .019 (10 cc. = 9.52 cc. N .02 HCl)			
				B-Gas Black				
0.5	9.45	8.13	1.32	138	9.52	9.28	.24	202
1.0	....	7.16	2.29	121	....	9.07	.45	190
2.0	....	5.49	3.96	105	....	8.68	.84	178
4.0	....	2.85	6.60	88	....	7.98	1.54	160
6.0	....	1.25	8.20	72	....	7.41	2.11	148
8.0	....	0.55	8.90	59	....	6.78	2.74	144
				A-Gas Black				
0.5	9.45	8.48	.97	102	9.52	9.31	.21	177
1.0	....	7.67	1.78	94	....	9.13	.39	165
2.0	....	6.13	3.32	88	....	8.78	.74	156
4.0	....	3.60	5.85	77	....	8.15	1.37	145
6.0	....	1.90	7.55	67	....	7.61	1.91	134
8.0	....	0.94	8.51	56	....	7.12	2.40	126
				D-Gas Black				
0.5	9.45	8.54	.91	96	9.52	9.35	.17	143
1.0	..	7.80	1.65	87	....	9.19	.33	139
2.0	.. .	6.56	2.89	76	....	8.90	.62	131
4.0	.. .	4.51	4.94	65	....	8.37	1.15	121
6.0	....	2.93	6.52	58	....	7.91	1.61	113
8.0	....	1.71	7.74	51	....	7.50	2.02	107

Remarks.—In the above table is shown a comparison of adsorption data for three different gas blacks, using varying weights of black, with .00236 and .019N DPG solutions.

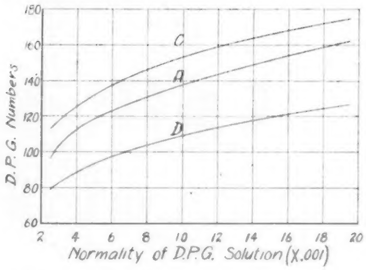
A = the equivalent of 10 cc. DPG solution in terms of a definite normality hydrochloric acid solution prior to the test.

A-X = the equivalent of 10 cc. DPG solution in terms of the same normality hydrochloric acid after the test.

X = amount of DPG adsorbed by the black, and is expressed in cc. of the above normality hydrochloric acid.

5. Details of Test. Weigh out six portions, two grams each, of the sifted black. Place each portion in a 250 cc. centrifuge flask. Moderately shake the contents for four one-minute periods, allowing five-minute intervals between shakings, one shaking at the beginning of the test and one shaking after every five minutes' soaking. Centrifuge solutions for a minimum period of three minutes. Pipette out three 10 cc. portions of the supernatant liquid from each flask and titrate with the corresponding acid solution, using the brom phenol indicator. The end point is taken when the solution turns yellow.

Fig. 4. DPG Adsorption Curves of Gas Blacks C, A, and D



6. Tabulating the Results. The DPG adsorption test data and results are recorded in Table 4. The titration results are all expressed in terms of one definite normality of acid, preferably .01N.

A = the equivalent of 100 cc. DPG solution in terms of cc. .01N hydrochloric acid prior to the test.
A-X = the equivalent of 100 cc. DPG solution in terms of cc. .01N hydrochloric acid after the test.
X = amount of DPG adsorbed by the black in terms of cc. .01N hydrochloric acid.

7. Determination of K. The log X and A-X values are plotted on coordinate paper. The log X values are plotted as ordinates, and the log A-X values as abscissas. The six points corresponding to the six different DPG normality solutions used are then located. A straight line is drawn through the six points. The line is extended until it inter-

TABLE 4

DPG ADSORPTION TEST DATA AND RESULTS

Normality of HCl Solutions	10 cc. of DPG Solution in Terms of HCl Solution	Normality of DPG Solutions	Grams DPG Per Liter
.0025	10.03	.00251	0.5296
.0050	9.74	.00487	1.0276
.0075	9.83	.00738	1.5572
.010	9.85	.00985	2.0784
.015	9.89	.01485	3.1334
.020	9.74	.01948	4.1603

DPG in Terms cc. N .01 HCl

Norm. HCl	A	A-X	X	DPG Nos.	Log A-X	Log X
			D-Gas Black K = 4.11			
.0025	25.08	17.63	7.45	79	1.2463	0.8722
.0050	48.70	39.90	8.80	93	1.6009	0.9445
.0075	73.73	64.07	9.66	102	1.8066	0.9850
.010	98.50	88.14	10.36	109	1.9452	1.0154
.015	148.35	136.95	11.40	120	2.1365	1.0569
.020	194.80	182.77	12.03	127	2.2619	1.0803
			A-Gas Black K = 5.01			
.0025	25.08	15.95	9.13	96	1.2028	0.9605
.0050	48.70	37.55	11.15	118	1.5746	1.0473
.0075	73.73	61.50	12.23	129	1.7889	1.0874
.010	98.50	85.40	13.10	138	1.9315	1.1173
.015	148.35	134.02	14.33	151	2.1272	1.1562
.020	194.80	179.42	15.38	162	2.2538	1.1870
			C-Gas Black K = 6.72			
.0025	25.08	14.40	10.68	113	1.1584	1.0286
.0050	48.70	36.25	12.45	131	1.5593	1.0952
.0075	73.73	60.08	13.65	144	1.7787	1.1351
.010	98.50	84.04	14.46	153	1.9245	1.1602
.015	148.35	132.60	15.75	166	2.1225	1.1973
.020	194.80	178.20	16.60	175	2.2509	1.2201
			B-Gas Black K = 6.72			
.0025	25.08	14.28	10.80	114	1.1547	1.0334
.0050	48.70	35.95	12.75	135	1.5557	1.1055
.0075	73.73	59.93	13.80	146	1.7776	1.1399
.010	98.50	83.70	14.80	156	1.9227	1.1702
.015	148.35	132.00	16.35	173	2.1206	1.2135
.020	194.80	178.20	16.60	175	2.2509	1.2201

(Continued on page 62)

Full Automatic Control of Platen Presses

W. C. Begeebing[1]

PROBABLY the most completely equipped battery of platen presses from the standpoint of automatic control has been in operation for the past three months at the plant of a well-known valve manufacturer.[2] The products handled embrace hundreds of molded rubber articles including washers, rings, caps, plugs, gaskets, stoppers, and valve disks. Many of these products such as valve disks must conform to very exacting time and temperature specifications and it was with this requirement in view that complete automatic regulation was decided upon. Important operating economies, however, are also obtained.

The installation, part of which is shown in Figure 1, consists of seven 24-inch by 24-inch, two-opening presses, with 16-inch diameter rams, and two 42-inch by 42-inch two-opening presses with 24-inch diameter rams. Each opening is 6 inches, and 1,600 pounds' ram pressure is used. These presses are cast steel throughout with rolled steel plates drilled for steam.

As shown by the close-up photograph, Figure 2, each press is equipped with a Tagliabue double-system temperature controller regulating a steam inlet diaphragm valve and simultaneously a condensation discharge diaphragm valve so that uniform temperature conditions are maintained throughout the press. The steam inlet control bulb is located in a circulation fitting in which the bulb of the Tagliabue industrial thermometer and recording thermometer are also placed. The bleeds from the circulation fittings are piped to outdoors where they discharge continuously. The condensation controller bulb is located in a condensation chamber at the right of each press. As these photographs were taken before insulation was applied or work tables installed, it is possible to follow out the piping without difficulty. The temperature controllers are operated by 15 pounds' air pressure.

The Tagliabue automatic time cycle controllers or "timers" are shown at the left end of each panel. They are arranged so that when the operator has a press loaded, he need only turn the handle on the controller case front to a stop pin. This turn brings the cam to the starting point or zero, starts the electric clock running, and operates the two-pressure hydraulic valve which closes the press. The controller, being set for the desired cure, will automatically open the press at exactly the correct time and keep it open until the workman unloads, reloads, and again turns the handle. In this way exact timing is assured. Two types of timers are used on this installation, those with and those without "bumping." The difference between these two types will be explained later.

[1]Assistant Chief Engineer, C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.
[2]Jenkins Bros., Rubber Plant Division, Elizabeth, N. J.

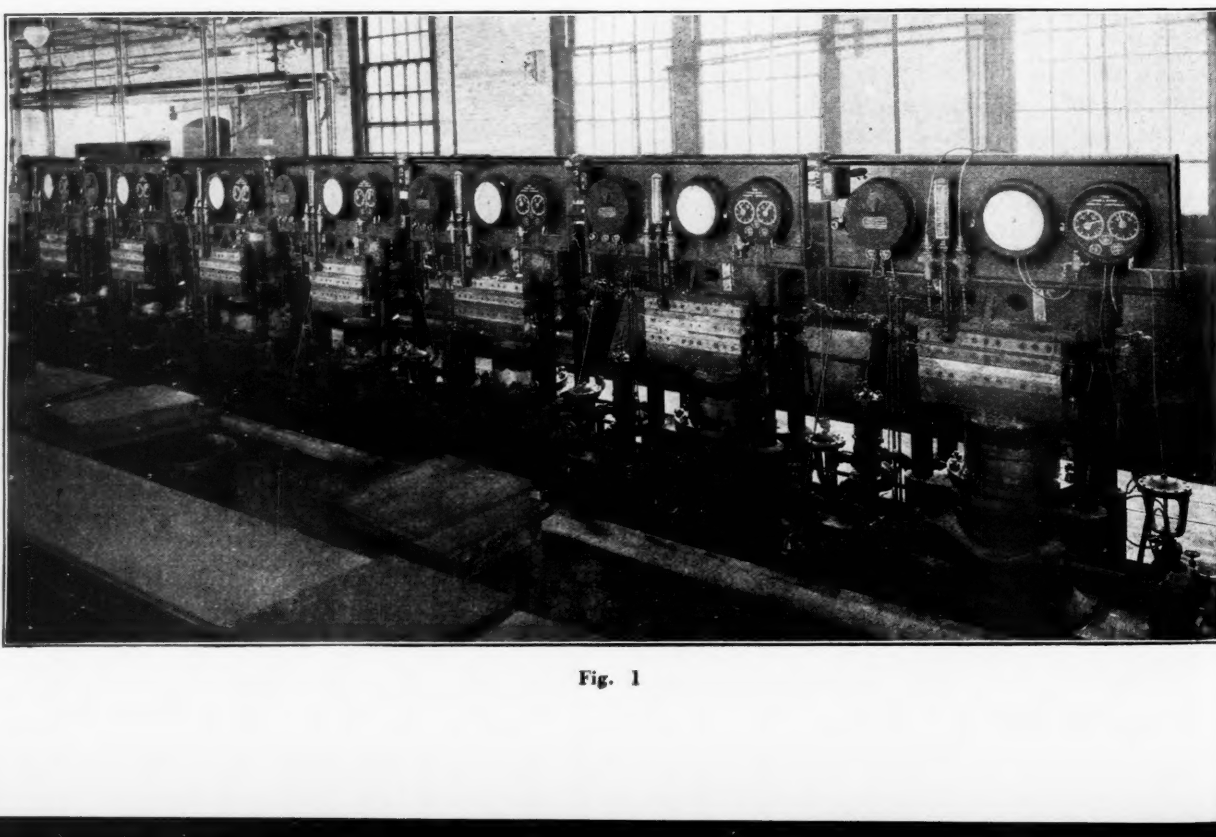


Fig. 1

The Tagliabue timer is shown in greater detail in the three accompanying photographs. The view showing the door closed, Figure 4, needs no explanation except as regards the small handle at the right-hand side of the case. This is an emergency press-opening device. Should a workman become caught as the press is closing or if for any other reason he finds it necessary to open the press after he has started the timer in operation, he simply turns this handle a quarter turn. Figure 3 shows the construction inside the case from which view it will be seen that the emergency lever turns a cam thus forcing down the main lever, operating both pilot valves, and opening the press. Once the emergency device has been used, the press is locked in the open position until the foreman unlocks the controller door and releases a latch on the emergency. The action prevents operators from using the emergency as a means of operating the press independently of the controller and thus shortening cures, which practice would, of course, defeat the whole idea of automatic timing.

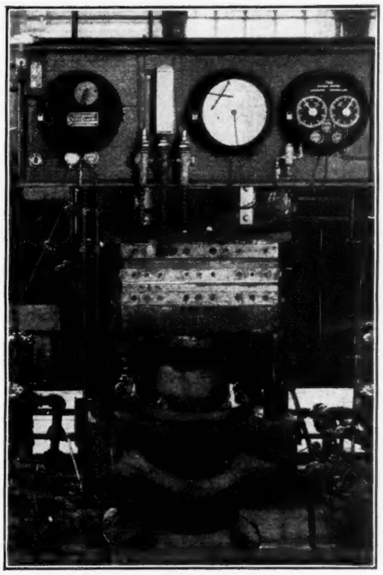


Fig. 2

The entire internal construction of the controller consists of the electric clock, zero reset device, sub-lever, main lever, and two pilot ball valves identical with those used in temperature controllers. These pilot valves are operated simultaneously, but, as one is a direct-acting and the other reverse-acting, air is admitted to one end and vented from the other end of the double-acting air cylinder of the valve. The air pressure employed is at 45 pounds' pressure.

Figure 5 shows the internal construction of a platen press timer which not only opens the press at the end of the cure but also "bumps" the press at any point or points during the cure as often as the schedule calls for. The long concentric slot in the cam permits location of the bumping sections wherever desired. The bumping is performed just as a skillful operator would do it. The press is opened far enough to allow the escape of the gases which have been generated and then reclosed; this action is repeated as often as the bumping section has notches. Either type of controller may be quickly and easily reset for any cure from 1 to 40 minutes, and longer cures can be arranged if necessary.

In general, automatic time control of platen presses has its most important value in attaining uniformity of products, the desirability of which needs no discussion. With this advantage goes a decrease in spoiled work, fewer seconds, and better satisfied users.

With accurate automatic timing, moreover, it is often possible to shorten the length of cure. With manual regulation the chemist realizes that his instructions are at the mercy of the human element, which at best may occasionally be careless or forgetful and at the worst may deliberately shorten the specified time to increase piecework earnings. The chemist must, therefore, include a more or less liberal factor of safety in his calculations. Once assured that the exact time and temperature of the schedule would be invariably repeated in production, cure lengths can be figured accordingly; and with shorter cures the same press equipment will yield a greater output.

Aside from the above advantages, the most tangible dollars-and-cents return from automatic press timing will be in labor. Instead of the time-consuming manipulation of the low and high pressure hydraulic valves, the operator merely turns the handle on the front of the controller and can then go to the next press. The controller automatically closes the press by means of the low pressure, and, when it is fully closed, the high pressure comes on for the duration of the cure. Exactly at the end of the cure the press automatically opens.

Careful time studies by several large mechanical goods manufacturers reveal an average labor saving of 30 to 40 per cent depending to some extent on the arrangement of the work and on the number of "bumping" operations involved.

On certain types of work it is desired to close the press with low pressure and maintain the low pressure for a certain definite time before putting on the high pressure for the balance of the cure. This arrangement has also been accomplished automatically. Figure 6 shows the arrangement of a Tagliabue timer operating a hydraulic valve, and Figure 7 shows the hook-up for a two-pressure valve which is operated by a diaphragm top instead of a cylinder.

The rubber industry has always led in the use of automatic controllers, but only recently has the subject of platen

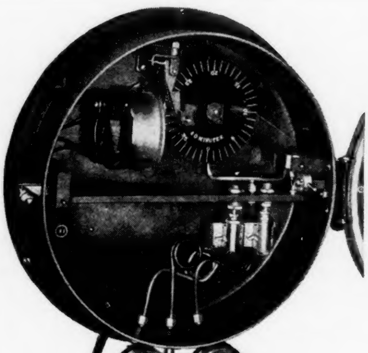


Fig. 3

Fig. 4

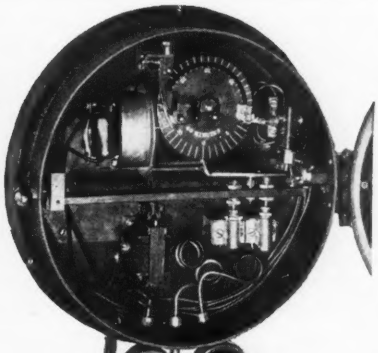
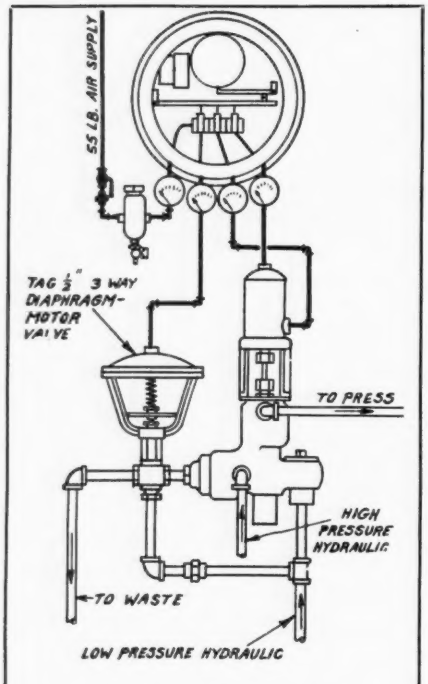


Fig. 5



TAG CYCLE CONTROLLER WITH STUART HYDRAULIC VALVE (SIDE CYLINDER REVERSED) ARRANGED FOR DELAYED HIGH PRESSURE

Fig. 6

press control received the attention it deserves. Results of the present installations justify the prediction that there will be an increased use of automatic time regulation in conjunction with suitable temperature control on this class of apparatus.

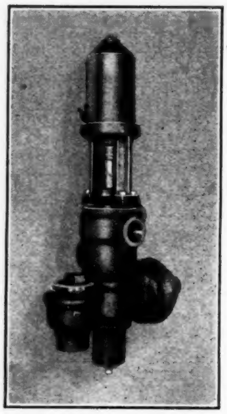
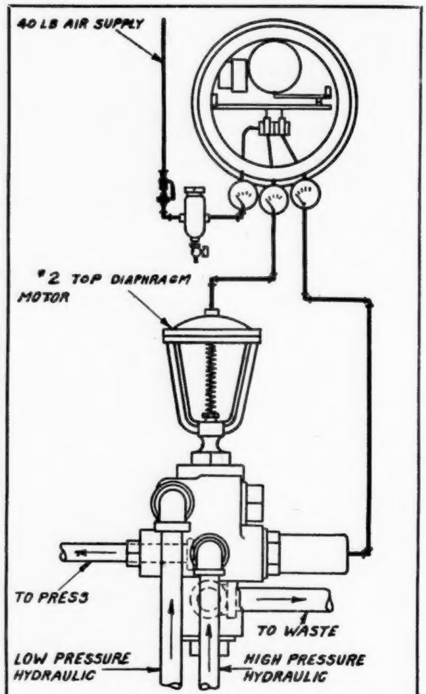


Fig. 8. Stuart Two-Pressure Hydraulic Valve with Air Operated Cylinder



TAG CYCLE CONTROLLER WITH FRENCH HYDRAULIC VALVE ARRANGED FOR DELAYED HIGH PRESSURE

Fig. 7

Evaluating Gas Blacks by the DPG Adsorption Method

(*Continued from page* 59)

cepts the ordinate axis. This point determines log K. The anti-log gives the K value. Graphs referring to three of the gas blacks are shown in Figure 3. Log K is the distance between the axis of abscissa and the point of intersection of the line with the axis of ordinate. X = amount of DPG absorbed by the blacks in terms of cc. .01N hydrochloric acid. A-X = the equivalent of 100 cc. DPG solution in terms of cc. .01N hydrochloric acid after the test.

DPG Number

The DPG number is the amount of DPG adsorbed by the black. It may refer to any number of grams of black. The figure of 10,000 grams is arbitrary. The DPG number is found for every normality DPG solution used. In Figure 4 are shown the graphs of three gas blacks when the DPG number is plotted against the normality of the DPG solutions. A typical calculation for a DPG number is shown below.

Consider the DPG solution .00251N.

DPG adsorbed by 2 grams black = 7.45 cc. .01N hydrochloric acid.
1 cc. N DPG = 0.211 grams DPG.
1 cc. .01N hydrochloric acid = 1 cc. .01N DPG = 0.00211 grams DPG.
7.45 cc. .01N hydrochloric acid = 7.45 × 0.00211 = 0.01572 grams DPG. adsorbed by 2 grams black.

$$\frac{0.01572}{2} = 0.00786 \text{ grams DPG adsorbed by 1 gram black.}$$

DPG Number = .00786 × 10,000 = 79.
The DPG Number may therefore be stated to be as follows:
DPG Number is equivalent to the DPG adsorbed by the black expressed in terms of cc. acid of a definite normality times the equivalent of 1 cc. acid of that normality in terms of DPG times 10,000 divided by the weight of black used.

The DPG adsorption method as described above may be simplified as regards time saving by using only four DPG solutions instead of six. In this case, however, greater care is required to determine the correct K value.

Literature

A study of adsorption by carbons and carbon black for different solutes has also been made by the following investigators: O. C. M. Davis[1] and J. B. Firth[2] have studied the adsorption of iodine by carbon; E. B. Spear and R. L. Moore[3] have obtained adsorption figures for malachite green; N. Goodwin and C. R. Park[4] determined adsorptive capacity of black for iodine and methylene blue in carbon tetrachloride and water solutions; H. R. Thies[5] found a difference in activity of black by noting their degree of adsorption of malachite green, also iodine; C. R. Johnson[6] has studied the adsorption of iodine and some organic accelerators (DPG and Captax) by gas black; G. M. Carson and L. B. Sebrell[7] have likewise studied the adsorption of DPG and Captax by different blacks; G. Fromandi[8] has made a study of the adsorption of acetic acid by carbon black; R. Ditmar and C. H. Preusse[9] have reported on the adsorptive capacity of carbon black for methylene blue.

Acknowledgment is made to N. Millman for assistance in compiling part of the test data in this article.

1 O. C. M. Davis, *J. Chem. Soc.*, 91. II, 1666 (1907).
2 J. B. Firth, *Trans. Farad. Soc.*, 16, 434 (1921).
3 E. B. Spear and R. L. Moore, *Ind. Eng. Chem.*, 18, 418 (1926).
4 N. Goodwin and C. R. Park, *Ind. Eng. Chem.*, 20, 621 (1928).
5 H. R. Thies, (unpublished), 1926.
6 C. R. Johnson, *Ind. Eng. Chem.*, 21, 1238 (1929).
7 G. M. Carson and L. B. Sebrell, *Ind. Eng. Chem.*, 21, 911 (1929).
8 G. Fromandi, *Kautschuk*, 6, 27 (1930).
9 R. Ditmar and C. H. Preusse, *Gummi-Ztg.*, 6, 243 (1930).

Rosin and Rosin Oil in Rubber and Reclaimed Rubber[1]

H. A. Winkelmann[2] and E. B. Busenburg[3]

ROSIN and rosin oil have been used for many years in rubber compounds and reclaiming. In spite of this fact no systematic work on rosin or rosin oil has ever been reported, and the rubber literature contains but few references. The literature does not differentiate between the available grades of rosin and fails to specify the particular grade which was used. With so little information at hand it is not surprising that rosin may often have been improperly used, and the experience of such instances has gradually accumulated so that one frequently hears the statement that compounds containing rosin do not age well. While some report unsatisfactory results with rosin or rosin oil, others have obtained very good results. Such contradictory reports emphasize the importance of a thorough study of rosin and rosin oil in rubber and reclaimed rubber, which will stress both the advantages and limitations of these materials and consequently make possible a more intelligent choice and use of the different grades.

TABLE 1. PROPERTIES OF GUM ROSINS

Grade	Melting Point Deg. C.	Melting Point Deg. F.	Acid Number	Unsaponifiable Matter, Per Cent	Saponification Number	Gasoline Insoluble Matter, Per Cent	Petroleum Ether Insoluble Matter, Per Cent	Specific Rotation, Deg.	Ash, Per Cent	Color: Lovibond Amber	Color: Lovibond Red	Color: Standard Cubes
B	86.5	187.7	165.6	7.2	175.2	2.5	4.3	+21.6	0.098	80	210	Less than D
F	89.5	193.1	162.8	8.5	173.0	1.6	4.6	+ 8.0	0.046	80	48	E to F
I	86.5	187.7	166.2	6.4	176.0	1.5	3.4	+30.6	0.025	80	3	I
N	81.5	178.7	162.7	8.9	176.0	1.1	1.8	+24.0	0.03	77	..	N
WW	81.5	178.7	162.6	9.8	171.9	0.4	1.2	+30.2	0.033	33	..	WW

Since the introduction of rosin, rubber compounds have changed from a rubber-sulphur mix, to a rubber-sulphur-litharge or other inorganic accelerator mix, and finally to those containing various organic accelerators. Rosin and rosin oil should be used with due regard to their effect on factory processing, to their effect on other compounding ingredients and on rate of cure. Rosin is an efficient softener, and it is possible that stiffness has often been obtained by cure rather than by compounding, thus resulting in poor aging due to overcure. Rosin and rosin oil can be used in rubber compounds with satisfactory results if properly compounded. In addition to presenting some original data the authors have incorporated much valuable information placed at their disposal by a large number of chemists in the rubber industry.

The literature on rosin and rosin oil in rubber compounds consists of a few scattered references, which indicate that both materials have been used for a long time. The reclaimed rubber literature, however, contains some valuable references on the early use of both materials.

H. L. Hall[4] in 1858 heated vulcanized rubber in lime water, water, or direct steam. He added rosin either prior to or after the heat treatment. J. H. Cheever[5] in 1860 used the distillation product of rosin for devulcanization. C. McBurney[6] in 1861 treated 100 parts of vulcanized rubber with 40 to 50 parts of rosin oil by allowing the mix to stand for 24 to 75 hours. The product was used in rubber compounds. E. Hunt[7] in 1866 treated vulcanized rubber below 300° F. with rosin. The rubber was recovered by precipitation with wood alcohol, and used for waterproofing. S. M. Allen[8] in 1887 treated fiber containing scrap rubber with equal parts of rosin. S. Kenyon[9] in 1889 dissolved vulcanized rubber in rosin or rosin oil at 240 to 300° F. T. Seehausen[10] in 1899 added 20 per cent rosin oil to 100 parts of vulcanized rubber and devulcanized for 2 hours at a pressure of 45 pounds. W. A. Köneman[11] in 1906 used rosin as a softener in a modified acid process of devulcanization. E. L. Rouxeville[12] in 1907 devulcanized with pine resin and purified the rubber by washing with alkali and then with acid. H. B. Cox[13] in 1916 used a solution of rosin in gasoline, naphtha, etc., for devulcanization, and J. F. Johnston[14] (1919) simply used rosin as a softener in the regular alkali process. S. E. Shepard and J. J. Schmidt[15] (1926 and 1929) digested hard rubber with sodium hydroxide and after washing and drying treated it with rosin and China wood oil (tung oil) at 200 to 250° C. (390 to 480° F.). The fused mass was dissolved in a solvent and used as a waterproof coating, paint, or varnish.

The United States Department of Commerce in reporting the annual consumption of rosin does not give any figures for the amount used by the rubber industry. A conservative estimate places the consumption of rosin by the rubber industry at 5,000,000 pounds annually.

Two types of rosin—gum and wood—are used. Each type consists of a number of grades which are classified according to color and impurities. The comparative effect of these grades in rubber compounds or reclaiming has not been previously reported. Gum rosin is graded according to color in thirteen different grades from the darkest, which is grade B, to the lightest, which is grade X. Grades B, D, and E are classed as low commons; grades F, G, and H, as high commons; grades I, K, and M as mediums and grades N, WG, WW, and X as pales. Typical analyses of the various grades of gum rosins are given in Table 1. There are seven grades of wood rosin which cover practically the same color range as the gum rosins. Grade B wood rosin corresponds to the low commons; grades FF, L (limed), and N wood rosins correspond to the mediums, and grades I, M, and commercial abietic acid correspond to the pales. The color of a

[1]Proceedings of the Thirty-third Annual Meeting, American Society for Testing Materials, Vol. 30, Part II, pp. 807-27.
[2]Palmer Gas Products Corp., Akron, O.
[3]Philadelphia Rubber Works Co., Akron Division, Akron, O.
[4]U. S. Patent No. 20,242 (1858) and No. 22,217 (1858).
[5]English Patent No. 325 (1861).
[6]U. S. Patent No. 33,094 (1861).
[7]English Patent No. 1,667 (1866).
[8]U. S. Patent No. 375,436 (1887).
[9]English Patent No. 14,150 (1889).
[10]English Patent No. 7,798 (1899).
[11]U. S. Patent No. 823,053 (1906).
[12]French Patent No. 375,709 (1907).
[13]U. S. Patent No. 1,202,760 (1916).
[14]U. S. Patent No. 1,291,535 (1919).
[15]U. S. Patent No. 1,583,703 (1926) and No. 1,701,129 (1929).

TABLE 2. PROPERTIES OF WOOD ROSINS

Grade	Melting Point Deg. C.	Melting Point Deg. F.	Acid Number	Unsaponifiable Matter, Per Cent	Saponification Number	Gasoline Insoluble Matter, Per Cent	Petroleum Ether Insoluble Matter, Per Cent	Color	Color Amber	Color Red
B	85	185	126	11.5	....	51.5	45.0	Dark	..	......
FF	78	172	150 to 155	6 to 10	168 to 175	8	7 to 10	Ruby red	80	75 to 120
I	80	175.5	163.4	7.3	171.1	0.06	1.5	Red	..	......
L	91	195	133	11.5	147	10	....	Amber red	..	......
Commercial abietic acid	78	172	80.5	7	174	0.05	0.75	Water white	..	......

rosin may not be indicative of its effect in rubber, and it may be of greater importance to study the physical and chemical analysis of the rosin.

Table 2 gives analyses of typical wood rosins and indicates what wide variations exist in melting point, acid number, saponification number, etc. These variations may affect the processing properties of the uncured compound as well as those of the cured product. When referring to rosin, it will avoid confusion and misunderstanding to specify the type and grade that is being used.

There are two kinds of rosin oil—the synthetic or blended type and the distilled. Blended rosin oil is prepared by dissolving 30 to 40 per cent of rosin in mineral oil. Pine oil or kerosene have also been used. The grade of rosin and kind of oil used have a marked effect on the behavior of this type of oil. It has an acid number of about 60 to 65.

Distilled rosin oil is prepared by the distillation of rosin and has an acid number which may run as high as 155. It is, therefore, not at all similar in composition to blended rosin oil and it is unfortunate that both materials are known as rosin oil. Both rosin oils could hardly be expected to give the same results in rubber. The difference in composition and acid number of blended and distilled rosin oil may account for many contradictory opinions regarding the behavior of rosin oil in rubber. At present there is very little distilled rosin oil used in rubber. L. E. Weber[16] in 1926 writing about synthetic or blended rosin oil stated, "Such a mixture should not be used by the rubber manufacturer."

Blended rosin oils having an acid number of 60 to 65 have been used in rubber compounds for many years with as good physical properties, aging, and service results as may be obtained with other materials used for the same purpose. The acid number and rosin content of retort and kiln pine tar lie in the same range as those of blended rosin oil. This may be illustrated by the following analyses of some commercial samples:

	Rosin Content Per Cent	Acid Number
Blended rosin oil	35	65
Light retort pine tar	31.55	70
Kiln pine tar	36.95	90

The above figures are a useful guide in interchanging softeners where it is desired to keep the rosin content the same. It is interesting to note that it has been common practice to substitute rosin for pine tar on this basis. There are also blended rosin oils on the market containing as high as 80 per cent rosin. If a blended rosin oil having a high acid number is substituted in rubber for any of the above, the cure must be carefully checked. A neutral rosin oil having an acid number of 8 has been tried out experimentally with good results. This rosin oil lacks the activating power of one with a high acid number but shows good aging properties.

Rosin is used in rubber compounds to produce softness and tackiness during the manufacturing processes. It acts as an activator of inorganic accelerators and sometimes of organic accelerators. Activation is often inhibited due to the softening effect of the rosin. H. P. Stevens[17] added colophony (rosin) to resin-free rubber and obtained the same vulcanization coefficient as was obtained with the untreated rubber. The activation of rosin during vulcanization is brought out by Stevens in the following table using 7 parts of sulphur on 100 parts of rubber:

	Modulus at 500 Per Cent Elongation, Kg. Per Sq. MM.	Vulcanization Coefficient
Untreated rubber	0.178	2.86
Resin-free rubber	0.213	2.71
Resin-free rubber + 2.5 per cent colophony	0.156	2.85

L. B. Sebrell[18] has found that abietic acid when compared with stearic acid on an equal weight basis lowers the modulus and tensile strength of a compound containing mercaptobenzothiazole. When the amount of mercaptobenzothiazole was increased from 1 to 1.75 per cent the modulus and tensile strength were satisfactory. The aging of the latter compound in the oven at 70° C. (160° F.) was the same as obtained with stearic acid.

Since rosin consists mainly of abietic acid, the authors compared a purified sample of the latter with stearic, palmitic and lauric acids for the activation of mercaptobenzothiazole (Figure 1) using the following formula:

	Parts
Rubber	100
Zinc oxide	5
Carbon black	40
Sulphur	3
Accelerator	0.6
Softener	4

Lauric acid speeds the cure more than stearic or palmitic acid. The softening effect of the abietic acid is very much greater than that of the fatty acids, which partially accounts

[16] L. E. Weber, "The Chemistry of Rubber Manufacture," p. 230 (1926).

[17] *Koll. Z.*, Vol. 14, p. 91 (1914).

[18] Private communication, Goodyear Tire & Rubber Co.

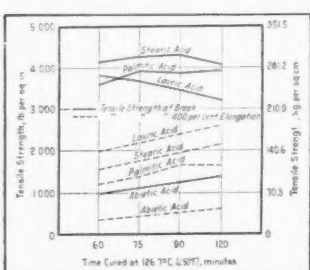


Fig. 1. Comparison of Acid Softeners Activation of Mercaptobenzothiazole

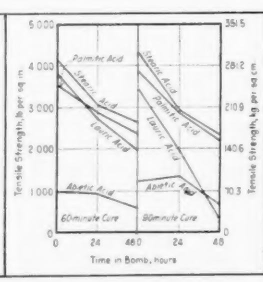


Fig. 2. Comparison of Acid Softeners, Bierer Bomb Aging

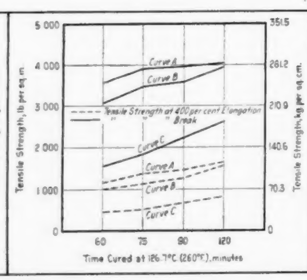


Fig. 3. Softeners in a Tread Stock Activation of Mercaptobenzothiazole

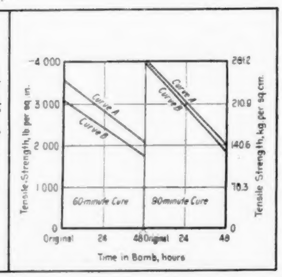


Fig. 4. Comparison of Softeners in a Tread, Bomb Aging

for the slowing up of the cure. Abietic acid is soluble in rubber; whereas stearic acid is not. This comparison, therefore, is not quite fair, but it is presented only from the standpoint of activation. The oxygen bomb aging (Figure 2) is interesting because, while the compound containing abietic acid is undercured, the tensile strength has not decreased after 24 hours' bomb aging.

W. W. Vogt[19] compared grades WW, N, and E gum rosins in a compound with mercaptobenzothiazole as accelerator. There was no difference between these rosins in their effect on modulus, tensile strength, or aging.

According to W. B. Wiegand[20] grade WG gum rosin has been used commercially for years in the manufacture of tap soles and other products. One of these compounds gave products having excellent physical and aging properties. This was a litharge compound in which the softener-sulphur-litharge ratio were in proper balance:

	Parts
Rubber	100
Carbon black	80
Litharge	13
Grade WG gum rosin	4
Pine tar	2
Sulphur	5
	204

Cure: 30 minutes at 40 lb. or 15 minutes at 65 lb.

The following captax tread compound was used in comparing Grade F wood rosin with pine tar and stearic acid:

	Parts
Rubber	100
Zinc oxide	5
Carbon black	40
Sulphur	3
Mercaptobenzothiazole	0.6
Stearic acid	4
Pine tar	3
	155.6

Cure: 60, 75, 90, 120 minutes at 126.7° C. (260° F.).

Following are the mixings corresponding with the curves shown in Figures 3 and 4.

	Curve A Parts	Curve B Parts	Curve C Parts
Rubber	100	100	100
Zinc oxide	5	5	5
Carbon black	40	40	40
Sulphur	3	3	3
Accelerator	0.6	0.6	0.6
Stearic acid	4	4	.
Pine tar	3	..	3
Grade F rosin	..	3	4

The compound containing 3 per cent of grade F wood rosin (Figure 3) cures slightly slower than with pine tar. There is not much difference in the modulus at 400 per cent elongation, but the tensile strength at break is a little lower with grade F rosin. The oxygen bomb aging (Figure 4) of the 60- and 90-minute cures shows no difference between the two compounds. When 4 per cent of grade F rosin was substituted for stearic acid (Figure 3), the compound was very much softer and the rate of cure was greatly reduced.

A comparison of several grades of gum and wood rosin was made in a pure gum compound, using diphenylguanidine as the accelerator. One-half per cent agerite powder was added to one compound containing grade F wood rosin. A sample of blended rosin oil and medium retort pine tar were included in the study. Grade K gum rosin had been used to make the blended rosin oil. The following grades of rosin were used and the physical properties which were determined are also listed:

	Acid Number	Melting Point, Ring-and-Ball Method, Deg. F.
Grade WW gum rosin	162.9	176
Grade M gum rosin	164.5	175.1
Grade G gum rosin	167.0	185
Grade I wood rosin	163.1	174.2
Grade F wood rosin	152.3	168.8
Grade B wood rosin	108	180.5
Retort pine tar	73.4	.....
Blended rosin oil	58.7	.....

The above softeners were used in the following compound:

	Parts
Smoked sheets	100
Zinc oxide	5
Sulphur	4
Softener	2
Diphenylguanidine	0.75
	111.75

The effect of these softeners on the plasticity of the uncured stocks was determined on both the Williams and Goodrich plastometers (Figure 5). The units for expressing plasticity are not the same for the two machines. On the Williams plastometer the higher the reading, the harder the stock; while on the Goodrich plastometer the higher the reading, the softer the stock. The Goodrich plastometer takes both retentivity and softness into account in measuring plasticity, whereas the Williams plastometer measures only softness. The ordinate values for K in the Williams plastometer have been plotted to bring out the maximum variation between the samples. The Williams and the Goodrich plastometers show that grades WW and G gum rosin give the most plastic stock; while pine tar gives the least plastic stock. Softness on the Goodrich plastometer is a measure of the deformation of the rubber under a given stress. The softness curve follows the Goodrich plasticity curve quite closely. Retentivity is the percentage of original deformation retained by the rubber. The grade WW rosin shows the highest retentivity or the least nerve; whereas pine tar shows the lowest retentivity and the most nerve. There is considerable variation in the plasticity, softness, and retentivity imparted by these various softeners. The type of rosin or the amount used should be carefully controlled. Rosin or rosin oil is often used in conjunction with other softeners to give tackiness for processing or construction purposes. Their efficiency in producing softness and tackiness, therefore, places a natural limitation on the amount that can be used. Gum rosins give more plastic, softer, and less nervy compounds than wood rosins. As the acid number of the wood rosins increases, the compounds become more plastic,

(*Continued on page* 67)

[19] Private communication, Goodyear Tire & Rubber Co.
[20] Private communication, Binney & Smith Co.

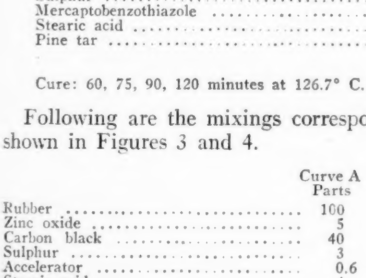


Fig. 5. Comparison of Softeners

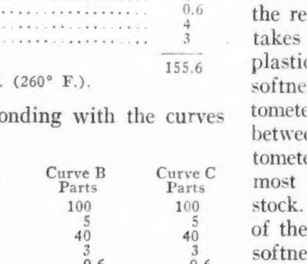


Fig. 6. Comparison of Softeners

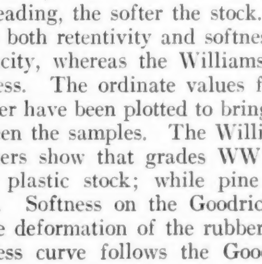


Fig. 7. Softeners in Oxygen Bomb

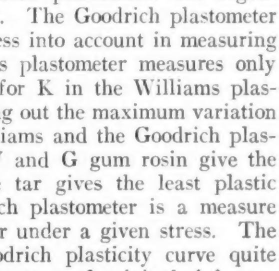


Fig. 8. Softeners in Oxygen Bomb

What Is the Answer?

A Statement Regarding the Rubber Situation

W. H. Dickerson

The author of this paper has been connected with the industry since 1915, and is well known in the trade. He was first assistant secretary of the Rubber Association, next, trade expert in charge of rubber in the War Trade Board at Washington, D. C., 1917-1918. Since 1919 and until recently he has been a crude rubber importer and dealer.

PARTICULARLY during the last year the executives of the rubber industry have been subjected to a full share of criticism. It has been criticism largely born of impatience and not coupled with a real understanding of some of the stupendous problems which have faced the industry.

The great contribution which the industry has made to human convenience, comfort, and efficiency through its remarkable scientific developments has proved a boomerang. No industry has made more notable improvement in its products. The fact that the mileage in tires has been multiplied several times over within a few years has created an excess plant capacity with its attending ruinous competition. Bear in mind, however, that the tire manufacturers cannot create new business as the number of tires required by the world depends upon the number of automobiles in use.

Again, consider the extreme fluctuations in the price of crude rubber, which has attended the development of the plantation industry in the Far East. That is a story in itself, but the fluctuation from 63 cents per pound during 1918 to a low of 12 cents in 1922, to a high of $1.23 in 1925 and a low of 7½ cents in 1930 has kept the industry continuously in treacherous cross currents. In fact since 1920 there have been only two or three years in which the high price of the year was not at least twice the low point.

It is true that the executives of the industry have made and are still making mistakes, but criticism which is not constructive will not help in the solution of existing problems. On the other hand a clearer understanding of the situation on the part of stockholders and directors should and will lead to improved conditions.

A few outstanding facts regarding the rubber industry as a whole are as follows:

Essentialness. It is second to none.

Invested Capital. It has over one billion dollars.

Sales Volume. It is normally among the five or six largest manufacturing industries.

Manufacturing. Its progress and achievements have not been surpassed by any industry.

Management. It has many men of outstanding ability, but has been decidedly deficient in cooperative leadership.

Tire Plant Facilities. At capacity, it is at present 50 to 75 per cent overexpanded.

Sales Policies. It has permitted the most ruthless competition.

Earnings. It has the poorest record of any large industry.

At present, the industry is in a critical and unprofitable condition. Its existence, however, is guaranteed by its essentialness; and its future prospects are decidedly promising. Permanent improvement, though, will become a reality only when the leading managements have arrived at a basis of understanding which will enable them to unite in a constructive program of co-operation.

It is intended that this statement shall be constructive. Everyone in the business is tired of hearing the industry's grief and should tire of passing it on. No red-blooded man wants either sympathy or pessimistic chatter. He welcomes constructive criticism and is willing to face the situation. Three opinions are most frequently advanced.

The first is that a merger of two or more of the largest companies would be the means of rectifying existing conditions. In my opinion that would not accomplish all that is necessary. Each of the four leading companies have assets of over $150,000,000, their total exceeding $800,000,000. A consolidation of two of these companies would, of course, lessen the number of powerful competitors, but without other favorable considerations, might not lessen the intensity of the competition. The benefits which might be derived from such a merger would not be reflected in the industry for a considerable period, and again, during the present conditions of the security markets such a merger would be difficult of accomplishment and subject to delays. There should and will be a number of mergers in the future, but the industry should not wait for something favorable to happen.

The second opinion is that a dictator should be secured to head the industry. In a measure this idea was attempted and unsuccessfully. At present even a Mussolini could not put the industry on a sound foundation, without honest cooperation. Constructive concerted leadership must come *from within.* There are several men of outstanding ability in the industry whose personal achievements exceed those of any man who might be secured to dominate permanently the industry. They have been honored by their companies and respected by their communities. They should so remain. I do not share the opinion that it has been definitely proved necessary for the leaders of this industry to be subservient to a dictator either of their own choosing or one thrust upon them by banking coercion. Assets, however, are being dissipated and the banks, bondholders, stockholders, employes, and even customers are all asking, "What Is the Answer?" and then adding, "Something Must Be Done."

The third opinion is that conditions will not improve until

after the industry has passed through further demoralization to such an extent that new interests will be enabled entirely to revamp it. This opinion is damnable. Figuratively, the industry is at the bottom now, and its comeback could be phenomenal with proper cooperation. I further venture the suggestion that nothing could do more to reestablish public confidence in the future of American business than the lifting of this great industry from the cellar and putting it out in the sunshine.

A constructive program must be based upon recognition of certain facts and conditions. The management of each company must recognize:

1. Their responsibilities to stockholders, to employes, and to the public.
2. That no company is entirely responsible for existing conditions, but none are blameless.
3. That the tire manufacturing capacity nearly twice exceeds present requirements.
4. That only so much business is to be secured and that price will only slightly vary the volume.
5. That the public is willing to pay a fair price for honest merchandise.
6. The manufacture and sales cost should not be based upon 100 per cent plant capacity but upon the approximate basis at which the industry is operating.
7. That mail-order house and chain oil-station competition has its limitations but cannot be prevented from running its natural course. Their cooperation should be encouraged. They have their own problems and should welcome it.
8. That an unfavorable financial statement of any large rubber company only complicates matters for every other company.
9. That smaller mismanaged and financially weak companies will eventually lose out and that the harm they may now do does not justify a larger company to take a loss to hurry a funeral. (It can, moreover, be proven that present conditions in certain instances have assisted in prolonging the life of weak, mismanaged companies.)
10. That consideration should be given to the crude rubber situation, recognizing the probability that the present demoralization of the plantation industry will make stabilizing much more difficult unless all the consumers cooperate.

If each of the leading companies will subscribe to the above, the way is cleared for immediate study and preparation of a constructive program. Logically this work should be done within the Rubber Manufacturers Association. The Association has been invaluable to the industry in many ways and is capably managed. The shortcomings of the industry cannot be blamed upon the Association for no association can be stronger than the willingness of its membership to cooperate honestly. All but one of the leading manufacturers are members, and the president of that company was president of the Association in 1918 and at that time urged the organization of a tire division to correct certain abuses, many of which still exist. Recently he publicly accepted responsibility for a reasonable share of the errors of the past and broadmindedly would, in my opinion, cooperate in all honest attempts to revitalize the rubber industry.

No problems facing it are insoluble. It is not even necessary to violate the spirit of the Sherman Act or any other law to put the industry on its feet. It is necessary that there be a recognition of certain facts as a starting point and a willingness to cooperate constructively. A modification of the Sherman anti-trust law would prove exceedingly helpful to the industry after it has demonstrated its ability to cooperate by doing the things it can now do legally under the existing law. Long-suffering stockholders are entitled to both a filling meal and dessert. They do not need to be kept from the table because the dessert is not quite ready.

In recent years no time has been so propitious for turning a new leaf and beginning over again, than right now. 1930 was a sad tire year for two principal reasons: first, poor volume which fostered cutthroat competition, and second, inventory depreciation. 1930 has passed. 1931 finds the industry in a very liquid condition. Tire dealers have been holding off hoping for lower prices, and to some extent the public has for the same reason. The public too has been using tires longer while practicing economy and as a result are riding closer to the fabric than usual. Again, a better automobile year is expected. All of these things would point to at least a normal tire year. In respect to inventories let it be again pointed out that crude rubber, which was as high as $1.23 per pound in 1925, is now selling at approximately 8 cents per pound; and with cotton at its lowest point, danger of further shrinkage of any consequence is eliminated.

Evidence is beginning to appear that leading executives have determined to reestablish the tire business among the respected industries. They should receive the support and encouragement of their stockholders and the public. Conversely, any executive who will not cooperate should receive the attention of his stockholders and board of directors. Every president should be able to state in his report for 1931 that his company had cooperated honestly, broadmindedly, and intelligently in the solution of problems which faced the industry at the beginning of the year.

Let me repeat that the essentialness of the industry is a guarantee of its future development and that it is destined again to take a position of leadership among our great industries.

Rosin and Rosin Oil in Rubber and Reclaimed Rubber

(*Continued from page* 65)

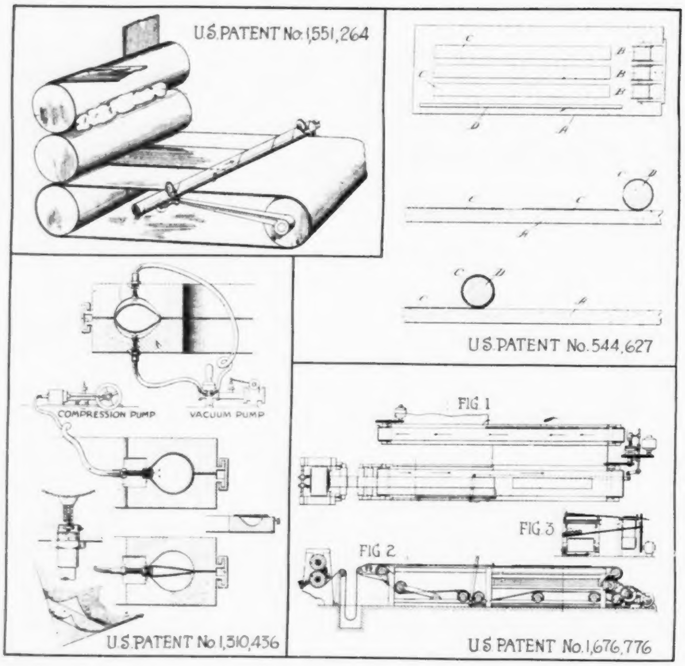
softer, and less nervy. The compound containing pine tar is not so plastic or soft and is nervier than those containing the rosins or blended rosin oil.

FORMULA FOR COMPARING SOFTENERS

	Parts
Smoked sheets	100
Zinc oxide	5
Sulphur	4
Softener	2
Diphenylguanidine	0.75

A comparison of grades M and G gum rosin (Figure 6), above formula, with blended rosin oil and pine tar shows that grade M rosin retards the cure. Grade G gum rosin and blended rosin oil give higher tensile strength than pine tar. Since the grade WW rosin tensile strength curve would lie midway between grades M and G rosin, it is not shown on the curve. There is very little difference between the softeners in percentage elongation. Oxygen bomb aging (Figure 7) shows the best results as regards tensile strength for pine tar and poorest for the blended rosin oil in the 60-minute cure; there is no difference in the 90-minute cure. The decrease in elongation (Figure 8) of the blended rosin oil is greatest in both 60- and 90-minute cures on bomb aging. There is very little difference between grades M and G gum rosin or pine tar in the decrease in elongation. In view of the plasticity measurements shown in Figure 5, one might expect a greater difference on aging because of the higher degree of disaggregation of the compounds containing rosin.

(*To be continued*)



Making Inner Tubes

A Survey of United States Patents Relating to the Methods of Manufacturing Inner Tubes

Joseph Rossman, Ph. D.

THE methods of making inner tubes may be divided into three classes: first, the tube is produced by a "tubing" machine; second, the tube is formed from a flat sheet with the longitudinal seam formed as a butt joint, which is cemented; and third, the tube is rolled directly on a mandrel from a flat sheet of sufficient width to form a laminated tube of a plurality of plies.

Tubes constructed according to the first method are vulcanized in molds or on mandrels in open steam. The second method possesses some disadvantages since the tube must be first formed and then placed on the mandrel as a separate operation and because a single ply of stock may contain holes which will cause leakage from the completed tube.

Tubes of the third class are free from these defects because they are formed directly on the mandrel; and since they are made of layers, any holes will not be continuous through the laminated wall of the tube. In commercial production it has been found necessary to vulcanize the tube under the compacting influence of a spiral wrapping, or at least to remove by a temporary spiral wrapping before vulcanization any air entrapped between the tube and the mandrel.

Tubes by Hand

In making inner tubes by rolling on a mandrel, thin sheets of rubber are superposed one upon the other in order that imperfections in one ply may be sealed by the other plies. This result is accomplished by rolling a thin sheet of rubber upon a mandrel of the desired diameter, which is given the necessary number of revolutions to make a tube of the desired number of plies, producing in effect a multiplicity of concentric tubes. The tube is then cured, and the mandrel withdrawn. A reenforcing patch is cemented on the inner side of the tube near one end. A hole is then made in the patch through which a metal valve nipple is inserted and clamped to the tube. The ends of the tube are then joined and cemented together, giving the tube an annular form.

An early method of making tubes according to United States Patent No. 544,627, August 13, 1895, to Morgan, is shown in the group picture. A felt covered table is used for the hand rolling operation. Rubber strips of the required width and indefinite length are rolled on spools B with a cloth liner between. These spools are placed at one end of the table so that preparatory to forming an air tube a strip C of rubber can be unwound, laid upon the table, and severed from the strip. The liner is removed from the strips preparatory to rolling them out. Strips C of rubber are each proportional in length of the tube to be formed by rolling them about the mandrel, and each strip is of a width to permit its longitudinal edge portions to lap when rolled into tubular form. The sheets C which form the plies of the tube are arranged side by side and at such distances apart that, when rolled up to form the multi-ply tube, the laps will be along separate lines having their relative distances apart determined by the spaces between the sheets as arranged upon the cushion table.

The several sheets are then successively rolled about a mandrel D and, while being thus rolled, the mandrel is depressed to compress the sheets between the mandrel and the cushion table and thereby roll the plies smoothly and exclude entrapped air. The tube thus formed is then vulcanized. Its ends can be closed in any suitable way.

Elimination of Wrapping

Rolling the rubber sheets on the mandrel was first performed by hand, but United States Patent No. 1,551,264, August 25, 1925, to Palmer, (shown in the illustration) applies the sheets of rubber directly from a calender on the mandrel in spiral form. This also eliminates the necessity of wrapping the tube on the mandrel for the purpose of expelling the air. The tube may then be transferred to the vulcanizing chamber. After curing it is removed and turned inside out as usual.

The rubber sheet formed by the calender rolls is divided into three strips. The central one is carried around the lower roll and passed along on the belt. The other two strips are directed upward and carried to other duplicate units for forming the rubber tube. The mandrel is laid across the belt and over the rubber sheet at an angle to the axes of the rolls so that, as the belt advances, the man-

drel is rotated and the rubber sheet wound spirally. The winding of the rubber on the mandrel by the movement of the belt automatically causes the mandrel to progress longitudinally in order to bring about the desired uniform spiral winding.

As each mandrel section moves across the belt and is wound with rubber, another is connected to the end thereof so that it rotates as a continuation of the preceding section. After each mandrel section has passed across the belt and been wrapped with rubber, the ends of the tube are bound down, and the rubber is cut to separate it from the following section. The tube next is vulcanized on the mandrel without further preliminary treatment.

A Recent Improvement of the Rolling Method

In working tubes by the old rolling process a reel of rubber was first prepared having a strip of protective material wound with the rubber to prevent cohesion. The rolls of sheet rubber are then carried away from the sheet-forming department and placed in storage until required for the manufacture of tubes. Thereafter the rolls of sheet material are withdrawn from storage and placed upon a stationary table where they are unrolled and cut into sections of the length desired for the tubes.

The method described in United States Patent No. 1,676,776, July 10, 1928, to Fleischli, comprises the step of passing rubber between rolls to form a strip of sheet rubber and intermittently severing the strip at a point between its free end and the rolls to provide sections of the length desired for tubes. The strip is constantly fed from the rolls, and an intermittent motion is imparted to the free end of the strip so that the severing operation can be performed while the end to be severed is at rest, without stopping the sheet forming rolls. The strip passing from the rolls is dropped into an open space where the intermediate portion of the strip hangs in the form of a loop, and the intermittent motion of the end portion of the strip will merely vary the size of this loop. The rubber strip thus formed is immediately cut into sections of the length desired, and these sections shaped to form the tubes.

In referring to the illustration, Figure 1 is a top view of an apparatus adapted for use in carrying out the method. Figure 2 is a side elevation of the apparatus with the calender rolls shown in section. Figure 3 is a transverse section.

The operations of forming the strip of sheet rubber and converting it into tubes proceed continuously. The calender rolls are driven constantly, but it is convenient to advance intermittently the free end of the rubber strip to provide intervals of rest for the severing and the tube forming operations. For this reason an intermittent motion may, if desired, be imparted to the conveyer belt. When the conveyer belt is at rest, the constantly rotating calender rolls feed the strip of rubber over the roll and into the unobstructed space between the rolls. After each severing operation the end of the strip may be lifted and moved backward to provide a space between the strip and the section severed therefrom. Thereafter the conveyer belt advances the severed section ahead of the adjacent end of the strip. In Figure 1 the severed section is located at the tube forming station, and this section is separated from the end of the strip. When the parts are positioned as shown in this view, the conveyer belt is at rest. While the strip is severed, a mandrel is placed on the free strip section to form a tube. In Figures 2 and 3 a supply of tube forming mandrels is shown. The operative places one of these mandrels on the strip and then rolls the mandrel toward the inclined surface in order to form the tube around the mandrel. The tube and the mandrel are then rolled across the surface to the conveyer belt, which carries them to another operative.

Successive portions of the continuous strip are thus shaped into the form of tubes while the strip is passing from the calender. When the operation is carried out, both ends of the tube are formed at the same time; for the mandrel does not move longitudinally during the tube winding operation. Each end edge of the tube is in volute form near an end of the mandrel, and by simultaneously forming both ends in this manner the final part of the winding operation is performed by acting upon a terminal marginal portion of the strip coextensive with the length of the tube. Owing to the adhesive condition of rubber stock issuing from a calender the long terminal margin just referred to is securely held by adhesion in a line extending from end to end of the tube.

Elimination of Rolling

The method of making tubes by the rolling method has been criticized as being wasteful of rubber and expensive in the amount of labor required. Besides the tubes produced have a number of disadvantages. Chief among these is the liability of leakage at the valve nipple and at the overlapped cemented joint of the tube; both of which connections are made after the curing of the rubber. Other disadvantages are that the grain of the rubber, resulting from the calendering, is all in one direction, that of the length of the tube, rendering the tube liable to tear.

The process of United States Patent No. 1,310,436, July 22, 1919, to Roberts, aims to remove these defects. Broadly it comprises placing two sheets of rubber across the mouths of two annular grooves in mold members, bringing two of these mold members together with their grooves facing each other and with a valve nipple interposed between the two rubber sheets, pneumatically forcing the two sheets of rubber into the respective mold cavities, and vulcanizing the tube in this condition. After vulcanization and the removal of the tube it is only necessary to trim off the flanges at the outer and the inner periphery; then the tube is complete.

The pneumatic forcing of the rubber sheet into its annular cavity may be effected by a vacuum applied to the respective cavities before the mold members are brought together. Thus the sheets are drawn into place, a visible inspection allowed of each half-tube and of the seating of the valve nipple in one of them, before the mold members are clamped together. After the mold members are clamped together, compressed air is supplied to the interior of the tube through the valve nipple. After this action the vacuum is relieved. The interior compressed air holds the rubber tight against the mold walls during vulcanization. The process is pictured in the group illustration.

(To be continued)

Safety in Design of Rubber Equipment

In the old days the machine, not the individual, was paramount; human life was not considered as valuable as today, and the quality and quantity of product considered the more important. The machine designer did not have a forecast of accidents, neither was it standard practice to equip against hazards. With the spread of the safety movement, laws, codes, etc., safeguarding of equipment is now considered first, with most concerns.

Familiarity, monotony, fatigue, are the cause of a large number of our accidents, so that safeguards have done much in reducing them. Today the designer, engineer and production men, all cooperate and this is the spirit of the present age. Of course the machine cannot think, and we must rely on the worker to do his share to study and suggest improvement. N. J. Maryanski in *Rubber Section, News Letter*, N. S. C.

EDITORIALS

Cultivated Guayule's Market Debut

AFTER a quarter century's production of commercial rubber from wild guayule almost wholly in Mexico, now comes the marketing of guayule rubber from cultivated shrubs wholly grown and processed within the United States. This achievement is made possible by the establishment of a highly equipped mill in California by a subsidiary of the Intercontinental Rubber Co., for the extraction of rubber from planted shrubs harvested after a four years' growth in the Salinas Valley, and under conditions that may well be duplicated on extensive areas in the South and the Southwest and where other crops have so often proved uncertain and unprofitable.

The successful launching of this new enterprise is not only a great credit to the Intercontinental company and its indomitable president, George H. Carnahan, but it is an inspiration to Americans generally. Such an achievement indicates not only new and important possibilities for agriculture, but the feasibility of complete production within the national borders of a staple commodity hitherto regarded as procurable almost solely from the distant tropics. Not the least advantage is the insurance it can afford against shortage in and extravagant prices for a most essential crude material, possible in the event of war or a devastating blight on foreign plantations.

Synthesists Seek Better Rubber

MANY rubber chemists fancy that there is much popular—and unpopular—misconception as to their aim in developing a synthetic material. They would make it plain that their quest is altogether unique. They seek not as those in other fields simply a substitute for a common basic commodity, but something which will improve on as well as replace Nature's product. At first its uses would perhaps be limited to goods requiring optimum qualities at any cost; but should crude rubber get dear, and synthetizing processes cheapen, then might the man-made material compete freely with the grown commodity.

It is recalled that synthetic amorphous solids of high molecular weight of the rubber and resin type can be readily produced from diolefins through carefully controlled polymerization, usually with high pressure, as indicated in numerous recent patents. The diolefins, of which butadiene is a familiar type, include members of the hydrocarbon series having the general formula of the acetylene series with a pair of double bonds replacing the single triple bond, derivable from crude oil.

The commercial success of rubber synthesis along such lines, however, must hinge on the cheap production of diolefins, which some believe may be brought about before long through high pressure hydrogenation of petroleum, in which direction varied and remarkable progress has been made of late in this country and abroad.

"Onward," Ford Brazilian Slogan

IT is gratifying to be assured officially that not only is there no truth in the report (possibly started by antagonistic propagandists) that the Ford rubber plantation enterprise in Brazil is to be abandoned but that, on the contrary, development will be prosecuted more vigorously than ever. It would, indeed, be widely regretted were such a great and well-sponsored undertaking even to lag, much less be forsaken. True, rubber may now be too cheap and abundant, but the time must come when the world will require practically all that can be obtained and when the price of so indispensable a commodity will once again yield a fair profit to its producers.

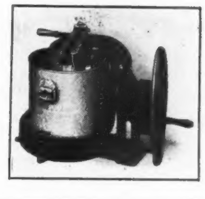
Oil Hydrogenation and Rubber

AN EPIGRAM of G. B. Shaw that science no sooner settles one problem than it raises ten others seems to apply as much practically as theoretically. The new treatment of petroleum with hydrogen under great heat and pressure is a case in point. Since the practicability of the hydrogenation process in replacing the cracking of crude oil for producing gasoline, etc., lately has been demonstrated in the United States, much speculation is being indulged in as to how several of the important byproducts can be satisfactorily utilized.

In the reactions during the process various hydrocarbon gases are yielded in addition to the main products. In one modification, for instance, much ethylene is produced, and with every 25 cubic feet of it comes 16 cubic feet of propylene. When demand catches up well with supply, in the oil industry will come large-scale operation of the new process and outturn of great quantities of the byproduct gases. Ethylene may be available at even two cents a pound and find new and extensive use in rubber and other manufacturing.

So, too, the production of great amounts of propylene also at low cost is significant to the chemical technologist. With such raw material cheap and abundant he dreams once more of its economic synthesis through the medium of isoprene into rubber or a compound with many of its properties. It is hinted that should the natural product rise again to but double its present low price, a new material may be vying for a place beside or between crude and reclaim.

What the Rubber Chemists Are Doing



Paragutta, a New Insulating Material for Submarine Cables[1]

A. R. Kemp[2]

FORMERLY deep sea cables were used exclusively for telegraph purposes, but in recent years there has been an increasing use of this type of cable for telephone service. Telephonic communication requires cables of very much superior transmission quality to that needed for telegraphs. At the higher frequencies of voice transmission the energy losses in the insulating material become a serious factor, and a radical improvement in submarine insulation is called for.

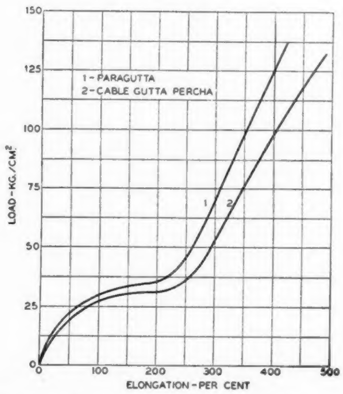
The longest existing deep sea cables operating at voice frequency only slightly exceed 100 miles, and the construction of a transoceanic telephone cable with standard materials has been regarded as beyond the practical limits of feasibility.

The installation and rapid expansion of transatlantic radio telephony during the past few years has created a need for a deep sea telephone cable to supplement this service particularly during periods of atmospheric disturbances. In addition the development of carrier telephony offers possibilities for increasing the traffic over shorter submarine cables. For the shorter cables the still higher frequencies of carrier telephony make demands upon the insulating material similar to those of long cables operating at voice frequency.

In view of these circumstances an extended study was undertaken of the causes of losses and other electrical weaknesses of submarine insulation and a search made for better materials. As a result of this investigation an insulation called paragutta has been developed, which, as the name suggests, is derived essentially from rubber and gutta percha.

Preparation of Paragutta

The principal constituents of paragutta are deproteinized rubber and purified gutta hydrocarbon. Specially treated hydrocarbon or montan waxes may also be added as a third constituent to modify mechanical properties and reduce cost. The proportions of these constituents may be varied over a wide range to achieve the desired characteristics; but in general rubber and gutta are used in about equal proportions, and purified montan wax may be added up to about 40 per cent. Superior electrical properties, however, result from the use of hydrocarbon waxes, which may be added in amounts up to about 20 per cent. By



Comparative Tensile Properties of Paragutta and Gutta Percha at 25° C.

the proper blending of these materials a thermoplastic insulation is obtained, which closely approximates gutta percha in mechanical properties and is fully its equal as to electrical stability in water. Its specific electrical characteristics represent a substantial improvement over those of the classical insulating compounds, and its cost is lower.

The final steps in processing paragutta are very similar to those used for gutta percha and involve blending and washing the deproteinized rubber and deresinated balata or gutta together, masticating to remove excessive water, and at the same time incorporating such waxes as are found necessary. The material is then strained through fine sieves under hydraulic pressure to remove adventitious impurities, kneaded to remove air, and finally placed on the covering machine rolls to be forced around the conductor. The machinery in use for processing gutta percha is suitable for handling paragutta in these operations.

Comparative Properties of Paragutta and Gutta Percha

TENSILE PROPERTIES. Although submarine insulation is not subjected to tensile deformation in practice, tensile properties indicate to some degree the relative mechanical suitability of a given material for the purpose. The illustration shows the stress-strain characteristics of paragutta and gutta percha submarine cable insulation. These results show that paragutta has tensile properties equal to cable gutta percha although its gutta content is substantially lower.

Summary

Summarizing this investigation the author says:

Gutta percha and balata have proven eminently suitable for the insulation of long deep sea telegraph cables, but their dielectric losses are too high to meet the requirements of submarine telephone cables designed to operate over long distances or of shorter cables employing carrier currents.

This paper describes a new material called paragutta which has been developed to meet the present needs. It consists essentially of the purified hydrocarbons of balata (or gutta percha) and of rubber together with minor quantities of waxes to modify the mechanical characteristics. The purification of rubber particularly with respect to proteins is necessary to effect electrical stability in water. A commercially usable method of deproteinizing rubber is described.

Evidence is furnished that paragutta has all of the desirable thermoplastic and mechanical properties of gutta percha while possessing such superior insulation characteristics as to make it suitable for use on long cables designed for transoceanic telephony. Its use is also advantageous on shorter deep sea cables designed for carrier telephony as well as for ocean telegraphs.

[1] *J. Franklin Inst.*, Jan., 1931, pp. 37-57.

[2] Bell Telephone Laboratories, Inc., 463 West St., New York, N. Y.

Life of Airbags[1]

A method of checking up the service given by airbags is suggested. In a given instance 1,000,000 tires have been manufactured in a year, 5,000 airbags have been discarded, while 76 airbags are still in use. If it is calculated that 1,000,000 divided by 5000=200=the average life of an airbag, the 76 airbags still in use and still having 50 per cent of their potential service to give, are left out of account. Therefore the following rule is suggested: From the number of airbags deduct X times the number of discarded airbags and divide the remainder by half the number of airbags in use.

In the above case X, the standard, equals 200. The figures recorded for each month, for example, are derived according to this formula, and the result is added to or subtracted from the standard.

[1] "Notes on Estimating the Life of Airbags." Th. W. Fazakerley, *Caoutchouc & Gutta-percha*, Jan. 15, 1931, pp. 15364-65.

Determination of Alkalinity of Reclaimed Rubber[1]

Henry F. Palmer and George W. Miller[2]

THE method described below overcomes the difficulties inherent in other methods at present in use since a relatively higher percentage of alkaline material is removed and a more efficient titration method is applied.

Method of Titration

Inasmuch as the color of the solution often causes the end point of usual indicators such as methyl red to be very indistinct, an application has been made of the iodine-starch end point. The procedure after the sample is prepared for titration is as follows:

To the solution 0.1 *N* HCl is added from a buret until the solution is distinctly acid. This point may be most definitely determined by using litmus paper. Approximately 5 cc. each of 3 per cent KIO_3 solution and of 1 *N* KI solution are then added. The mixture is allowed to stand 3 minutes and the same volume of 0.1 *N* $Na_2S_2O_3$ as 0.1 *N* HCl is added. The mixture is allowed to stand for 15 minutes after which 5 cc. of fresh starch solution are added. Titration is then made with 0.1 *N* iodine solution until the appearance of the usual iodine-starch blue color. This color may, of course, be black, due to the brown color of the solution.

The particular advantage of this method of titration is that the end point can always be distinguished and even the darkest solutions can be diluted so that the end point is visible. In cases of reclaim of low alkalinity the solutions are less deeply colored and the end point may often be determined in a satisfactory manner by the use of methyl red instead of the iodine-starch combination.

It should be mentioned that before arriving at the above method an effort was made to use either of the two following methods:

1. Use of $K_2Al_2(SO_4)_4.24H_2O$: Since $K_2Al_2(SO_4)_4$ hydrolyzes in water to H_2SO_4 and $Al(OH)_3$, the H_2SO_4 reacts to neutralize the alkali and the $Al(OH)_3$ carries down a considerable amount of colloidal matter in the solution, but not enough to render the solution sufficiently clear to discern methyl red indicator.

2. Use of $FeCl_3$ and $K_4Fe(CN)_6.3H_2O$: When $FeCl_3$ hydrolyzes in water to form HCl and $Fe(OH)_3$, the HCl will neutralize the alkaline material. Any soluble ferric salt gives with $K_4Fe(CN)_6$ a very deep blue color. In using this method $FeCl_3$ was added until all the alkali was neutralized; the blue color was formed by the excess $FeCl_3$ with $K_4Fe(CN)_6$. The color was masked considerably, however, by the presence of the $Fe(OH)_3$. The addition of HCl to diminish the amount of $FeCl_3$ necessary was not effective since the indicator was not sensitive to such a small amount of $FeCl_3$.

Extraction of Alkaline Material

Since other methods in vogue have extracted a relatively small amount of the total alkaline material, an effort was made to evolve a method which would give a higher percentage of the total alkali present. This has been achieved by the use of the following procedure:

The sample of reclaim is sheeted to a thickness of 0.127 mm. (0.005-inch) plus or minus 0.0254 mm. (0.001-inch) in thickness. A 5-gram sample is torn in pieces about 25 mm. (1 inch) in diameter and placed in a liter Erlenmeyer flask to which have been added 60 cc. of benzene, 40 cc. of ethanol (denatured with 0.5 per cent benzene), and 100 cc. of distilled water. These reagents must, of course, be neutral. A reflux condenser is attached to the flask, and digestion is made for 2 hours on a hot plate which is at 110° C. After the digestion 500 cc. of distilled water are added and the heating continued for 1½ hours without the reflux condenser attached. At the end of this time the benzene and the larger percentage of the ethanol will be completely distilled off. If benzene is still present at the end of this time, the heating, with a periodic shaking, should be continued until all benzene is removed. The total heating time will not exceed 1¾ hours. The solution is then decanted leaving the rubber sample in the flask. Seventy-five cubic centimeters of boiling distilled water are added, and the flask whirled rapidly to wash the sample. This water is added to the original liquid, and two more washings are made as mentioned above, after which the solution is allowed to cool preparatory to titration.

In the balance of their paper the authors record their observations on the effect of time of digestion, amount of water added after digestion, number of washings, error caused by retention of liquor by sample, and the influence of other factors on the dependability of the method.

[1] Presented before the Division of Rubber Chemistry at the 80th Meeting of the A. C. S., Cincinnati, O., Sept. 8 to 12, 1930. *Ind. & Eng. Chem.* (Analytical Ed.), Jan. 15, 1931, pp. 45-48.
[2] Xylos Rubber Co., Akron, O.

Hydrone

Hydrone is a liquid accelerator of vulcanization believed to be better than any other for use in rubber latex because its liquid condition allows it to be stirred into the amount required. If powdered accelerators are used, there is a difficult problem of dispersion, which is avoided by using Hydrone.

The average amount of Hydrone used is 1 per cent based on the rubber content of the latex. With this quantity of Hydrone dipped articles made from latex cure quite rapidly in water at about 200° F. or in air at slightly higher temperatures. Its ready miscibility in latex and its activity at low temperatures render Hydrone very adaptable for use with that material.

Lecture on Rubber[1]

GUISEPPE BRUNI, of the Polytechnical School of Milan, in response to an invitation of the Rubber Section of the Society of Industrial Chemistry, lectured December 17, 1930, on the "Evolution of the Rubber Industry in the Last Quarter Century."

After a review of the progress of consumption and production of rubber and its price, the lecturer discussed the era of accelerators and described at length tests in aging made with a mixing of rubber, 100, sulphur 8, with and without accelerators and antioxidants in various combinations. The aging tests were carried out in an oven at 78° C. and showed that the accelerator tripled the duration of the period in the oven. The action of the antioxidant was apparent both in the accelerated and non-accelerated mixing. The representative curves were those of the tension product, that is, the energy at rupture. The tension product is considered the most interesting physical datum to be observed in artificial aging and in establishing the optimum vulcanization.

[1] *Rev. gén. caoutchouc*, Dec. 17, 1930, p. 35.

Consistency of Particles in Balata Latex[1]

IN VIEW of the considerable improvement in the method of investigating with the micro-manipulator since 1925, when the only examination into the consistency of the molecule in balata latex was made in this manner, E. A. Hauser decided to examine balata latex again. He used a so-called manipulator-dark field condenser, a new instrument recently perfected which permits the dissecting needle to be introduced in such a way that it does not become visible until its point is within the focus of the condenser. The needles are readily made with the aid of another very new instrument, a needle-drawing apparatus.

The balata latex came from Peru and was preserved by the addition of a small quantity of acetic acid. Since the acid character of the latex, however, may have produced certain changes in the consistency of the particles, the conclusions do not apply unreservedly to fresh balata latex.

The particles were found to belong to two distinct groups. Those in the first were sticky and plastic, probably representing the resinous portion of the balata latex; those in the second were considerably smaller and apparently represent the actual hydro-carbon portion. They have a viscous center but become more plastic and even show a certain elasticity toward the outside. This characteristic appears to confirm Miedel's findings with extractions of balata: namely, that balata freed of resinous components yields a thermoplastic, but also noticeably elastic product. The particles of the first group fuse to a mass, but those in the second retain their individuality probably because of an adsorbed coating of the non-balata products dissolved in the serum.

[1] "Contribution to the Consistency of the Particles in Balata Latex." E. A. Hauser, *Kautschuk*, Jan., 1931, pp. 2-3.

Rubber Division, A. C. S.

Akron Group

The regular winter meeting of the Akron Group, Rubber Division, A. C. S., held Monday evening, February 9, at the Firestone Clubhouse, was attended by about 125 members. Officers elected for the current year were: chairman, P. P. Crisp, Firestone Tire & Rubber Co.; vice chairman, H. J. Conroy, General Tire & Rubber Co.; secretary-treasurer, L. W. Brock, Godfrey L. Cabot, Inc.

Subsequent to the election of officers, the following interesting papers were read.

"Recovery of Rubber and Cotton from Uncured Tire Ply Scrap," C. S. Powell, of the Firestone company. The various methods of separating fabric from uncured rubber were reviewed, and details given of a process in which the scrap is tumbled in a revolving screen immersed in solvents, the dissolved rubber is drawn off, and the solvent renewed periodically. The cement and the cotton thus separated are utilized in various factory processes.

"Effect of Storage on Plasticated Rubber," by C. M. Carson, of the Goodyear company. The author illustrated the changes that occurred in 40,000 pounds of rubber milled to different plasticities, packed and stored under different conditions.

"Drop Center Tires and Rims," by H. A. Brittain, of the Goodyear company. This paper was illustrated with lantern slides comparing American with foreign drop rims. The advantages and disadvantages of both types were pointed out, and the essential modifications indicated that would be necessary to adapt the foreign type of drop center rims for successful use on American cars.

After the meeting came the social hour when coffee, doughnuts, and smokes were served.

New York Group

The New York Group, Rubber Division, A. C. S., will hold its first 1931 meeting at Cavanagh's Restaurant, 260 W. 23rd St., New York, N. Y., at 6:30 P.M. Wednesday, March 11.

Two papers will be presented. One by E. K. Files and M. R. Buffington, of Lea Fabrics Co., Newark, N. J., on "The Manufacture of Carpets by a New Process Involving the Use of Unspun Fibers Organized to Fabric Backing." The other paper will be read by W. B. Wiegand, of Binney & Smith Co., on "The Effect of Overmilling on Natural Aging."

After the meeting an interesting entertainment will be given as in former meetings.

Everyone interested in current technical advances of the rubber industry should attend each meeting of the 1931 season. Not only will rubber chemists and engineers find these meetings profitable, but all others connected in any way with testing, selling, or production will benefit by attending.

John P. Coe, Naugatuck Chemical Co., 1790 Broadway, New York, N. Y., has been appointed secretary-treasurer of this group.

Boston Group

The first 1931 meeting of the Boston Group, Rubber Division, A. C. S., will be held in Boston, Thursday, March 5, at 6:30 P.M., at the University Club. The meeting as usual will be preceded by dinner followed by a brief business session. A program of broad interest has been arranged. The speakers for the evening include Karl T. Compton, president of the Massachusetts Institute of Technology, who will speak on "Relation of Science to Industry;" Harry L. Fisher, General Laboratories, United States Rubber Co., on "What Is New in Rubber Chemistry;" and A. A. Glidden, Hood Rubber Co., on topics of general interest. Dinner reservations can be made by addressing the secretary, T. M. Knowland, Boston Woven Hose & Rubber Co., Cambridge, Mass.

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Organization and Management of Rubber Factories. J. Audy, *Rev. gen. caoutchouc*, Dec., 1930, pp. 9-18. Diagrams. (To be continued).

Adsorption Theory in Vulcanization[1]

In a recent article Heinrich Loewen disputes Ostwald's adsorption theory and points out that Ostwald in attempting now to make use of the Loewen calculations of 18 years ago to support his adsorption theory, has omitted the essential part: namely, that in the calculation mentioned the exponent m practically comes to 1 so that the adsorption formula loses its distinguishing characteristic, and the calculation instead of proving adsorption is against it.

[1] "The Adsorption Theory of the Absorption of Sulphur in Vulcanization." Heinrich Loewen, *Gummi-Ztg.*, Jan. 9, 1931, p. 622.

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Technical Communications

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Gastex Comparisons and Utilization

IN A series of tests made to determine the rate of moisture adsorption by different types of carbon, the dry blacks were exposed to a saturated atmosphere at 30° C. and the increase in rate noted at 24-hour intervals. It was found that Gastex, Fumonex, P-33, and Thermax reached equilibrium with the saturated atmosphere in 24 hours while channel black adsorbed moisture for three days. The amount of moisture adsorbed by the soft blacks was about 0.10 per cent, while the channel black adsorbed 2.6 per cent. These tests show conclusively that Gastex is much better in this respect than a channel black, but that it is not better than the other types of soft blacks on the market.

A summary of the results obtained on determining the oil resistant properties of Gastex are given in Tables 1 to 5. In this summary it is shown that Gastex is superior to glue, whiting, lithopone, clay, zinc oxide, and channel black at the same volume loading. In view of the fact that higher percentages of Gastex can be milled in rubber without adversely affecting the physical properties, it is evident Gastex is much more satisfactory for use in oil resistant stock than other pigments which cannot be used in such large amounts. It was also found that the effect of increasing the time of cure does not have as much effect on improving the oil resistant properties of the stocks as an increase in the amount of Gastex used.

TABLE 1

COMPARISON OF PIGMENTS

20 Volumes of Pigments to 100 Volumes of Rubber

Pigment	Modulus	Tensile	Oil Adsorption (% Increase in Vol.)
Gastex	2,200	3,950	155
Whiting	800	3,350	170
Zinc oxide	800	3,600	175
Channel black. .	2,000	4,400	180
Lithopone	800	3,650	180
Clay	1,400	3,250	205

Formula, 100 M.S.S., 5 zinc oxide, 4 stearic acid, 3 sulphur, 1 accelerator No. 808, and pigments as noted above.

TABLE 2

COMPARISON OF GLUE AND GASTEX

30 Volumes of Filler to 100 Volumes of Rubber

Filler	Tensile	Oil Adsorption (% Increase in Vol.)
Gastex	1,210	180
Glue	950	222

Formula, 100 M.S.S., 5 zinc oxide, 100 whiting, 2 stearic acid, 10 sulphur, 3.5 No. 808, and pigments as noted above.

TABLE 3

EFFECT INCREASING RATIO OF SULPHUR TO RUBBER

Filler	% Sulphur	Tensile	Oil Adsorption (% Increase in Vol.)
Gastex	6	1,450	152
Gastex	8	1,450	160
Gastex	10	1,450	166

Formula, 100 M.S.S., 5 zinc oxide, 2 stearic acid, 100 whiting, 3.5 No. 808, 90 Gastex, and sulphur as noted above.

TABLE 4

COMPARISON OF DIFFERENT RATIOS OF GASTEX TO RUBBER

Vols. Per 100 Vols. of Rubber	Parts Per 100 Parts of Rubber	Tensile	Oil Adsorption (% Increase in Vol.)
31	60	1,210	180
46.5	90	1,450	166
62	120	1,400	147

Formula, 100 M.S.S., 100 whiting, 5 zinc oxide, 2 stearic acid, 10 sulphur, 3.5 No. 808, and Gastex as noted above.

TABLE 5

COMPARISON OF DIFFERENT RATIOS OF GASTEX WITH GLUE

Filler	Vols. Per 100 Vols. of Rubber	Tensile	Oil Adsorption (% Increase in Vol.)
Gastex	51.6	1,450	144
Gastex	41.5	1,400	160
Gastex	31	1,300	174
Glue	31	1,120	203

Formula, 100 M.S.S., 100 whiting, 5 zinc oxide, 2 stearic acid, 10 sulphur, 3 No. A-16, Gastex and glue as noted above.

Gastex in Footwear Stocks

Most rubber footwear companies require a black stock which can be used next to a light-colored stock without discoloring the latter. A series of tests were made, comparing the properties of Gastex, Fumonex, P-33, and Thermax. In these tests a white stock was placed on top of a black one containing the black to be tested, and vulcanized in an air bath at 40 pounds' steam pressure. These stocks were then exposed to ultra-violet light from a quartz mercury vapor lamp for 12 hours.

It was found that the stocks containing Gastex and Fumonex showed very little stain while the stock containing Thermax showed a light brown stain, and the stock containing P-33 showed a heavy greenish brown stain. In view of these results it does not seem likely that P-33 or Thermax will be used in rubber footwear stocks. Gastex will be better to use in these types of stocks than Fumonex since in addition to not staining the rubber it also has better physical properties, such as tensile strength, resistance to abrasion, flexing, and aging. Data from General Atlas Carbon Co., 60 Wall St., New York, N. Y.

Suprex White

SUPREX WHITE is a new rubber filler offered as a substitute for blanc fixe, particularly for inner tubes. In addition to being slightly cheaper in pound cost, it represents a volume saving of nearly 36 per cent by reason of its 2.70 specific gravity as compared with 4.20 for blanc fixe. The material is a highly purified type of calcium carbonate, precipitated directly from the highest quality raw materials. By a unique process the particles are formed in a very fine state of subdivision, and this characteristic accounts for its remarkable re-enforcing property.

Compounded on equivalent volume basis, Suprex White develops approximately the same curing curve as blanc fixe, but a distinctly higher ultimate tensile and slightly higher stress-strain results. Resistance to tear and abrasion, and aging properties compare favorably with blanc fixe.

The following table indicates the comparative stress-strain values of Suprex White and blanc fixe when compounded in a typical inner tube formula on an equivalent volume basis and press cured at 45 pounds steam pressure.

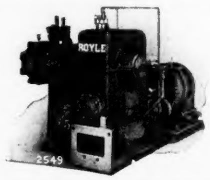
Data from J. M. Huber, Inc., 460 W. 34th St., New York, N. Y.

Minutes Cure	Load at elongation 300%	Load at elongation 500%	Tensile at Break	Per Cent Elongation at Break	Tensile Product	Durometer (Shore)	Tear
SUPREX WHITE							
4	140	320	1,530	860	147	37	950
7	180	590	2,635	790	234	40	1,190
10	230	690	2,925	780	258	43	1,270
13	240	670	3,115	800	280	43	1,220
BLANC FIXE							
4	90	310	1,600	830	149	35	1,000
7	140	470	2,345	800	211	40	1,155
10	230	600	2,760	780	243	41	1,240
13	220	580	2,940	810	267	42	1,220

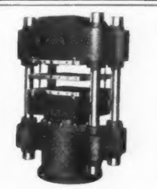
Telloy

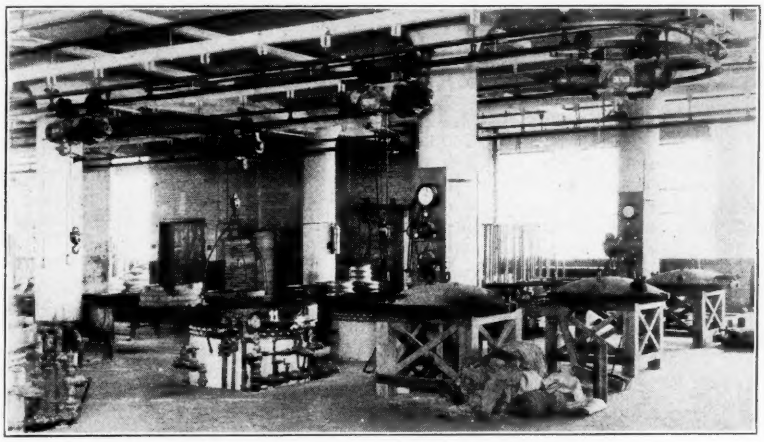
THE new secondary vulcanizing agent, Telloy, is a form of elementary tellurium specially pulverized and purified for use in rubber. From physical data it appears that tellurium products form entirely new combinations with the rubber molecule. Patents relating to the use of tellurium have been granted. Telloy is the first of these products to be offered to rubber goods manufacturers. In using tellurium about one-third the amount of sulphur should be displaced by Telloy. What might be termed a different type of vulcanization is then obtained, indicated by a stiffer, snappier stock more resistant to various factors affecting the life and service of rubber products. Data from R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y.

AFTER RINGING HER TIME CARD AN employe went after cement. In going back to her table she fell over a shoe case on the floor and received a fractured left shoulder. It is estimated that this employe will be disabled for 84 days. *National Safety News.*



New Machines and Appliances





Shepard Niles Electric Hoist in a Tire Plant

Electric Hoist

IN VERY many points in a rubber manufacturing plant it is necessary to raise, lower, and move from place to place very heavy weights in the course of processing materials. Typical jobs of this sort are raising and lowering rolls of calendered fabrics such as heavy rolls of frictional duck for belt making, which must not only be transferred from front to rear of the calender but loaded for delivery into the making department.

A similar instance is lifting off the heavy covers of vulcanizers and tire heaters and hoisting out of tire molds and their removal to the mold opening benches for discharging the goods. While such problems have always confronted the rubber worker in earlier years, hoists operated by handpower chains were used and answered very well. These were later superseded by air power lifts.

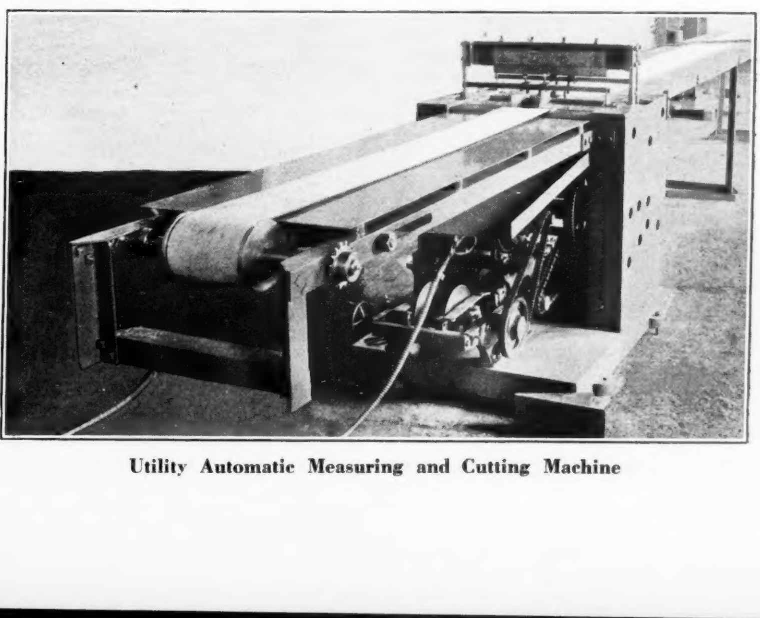
The latest equipment for efficient lifting and transfer duty is the electric hoist, a favorite type of which is pictured in the illustration of a tire vulcanizing room. In this instance four electric hoists are movable on trolleys running on tracks suspended from the ceiling. By this means the vulcanizer covers are easily lifted from the closed heaters and set aside on stands provided to hold them ready at hand for closing the vulcanizer for the next heat. Meantime the hoist is used to unload the tire molds and transfer them for opening.

Practically the only attention that this hoist needs is lubrication, and that demands only a minimum time because the lubrication is of the oil bath variety. Balanced drive, rigid alinement, and unit construction are other features of the hoist. In addition all the vital parts are sealed in a housing for secure protection against the entrance of dirt and moisture.

In connection with the serviceability of this construction it is said that in a large mechanical rubber goods plant one of these hoists has averaged 180 lifts a day for ten years and is good for the same service for an indefinite time. Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

Stock Cutting Machine

THE automatic measuring and cutting machine here pictured is constructed in various widths to accommodate manufacturing requirements. It is built in two types, for square cuts and skive cuts. The machine measures and cuts to accurate lengths. The length of cut may be varied at the will of the operator, without stopping the flow of the stock. The cutting range is adjustable to almost any length that may be specified. The feed of the stock does not hesitate for the cutting operation.



Utility Automatic Measuring and Cutting Machine

The cutter head meets the advancing stock and travels with it while the cut is made, returning then to normal position. The machine will operate on stock delivered from a calender, a tuber, or a roll. The speed of the stock travel is governed by a variable speed drive so that the cutter can be operated at a speed to suit the machine furnishing the stock to be measured and cut. The cutter knife operates against a revolving cutting block, thereby insuring a clean cut.

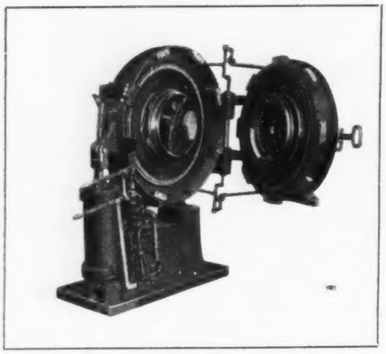
Stock cooling tanks and conveyers can be combined for operation with the machine, and all be driven from the cutter motor and the same variable speed drive, thus bringing the entire system under one-man control.

The intake and the discharge belts may be varied to suit conditions of long combination and assembly tables. When raw tubular stock is cut, an attachment is utilized to open the ends of the tubes. Utility Mfg. Co., Cudahy, Wis.

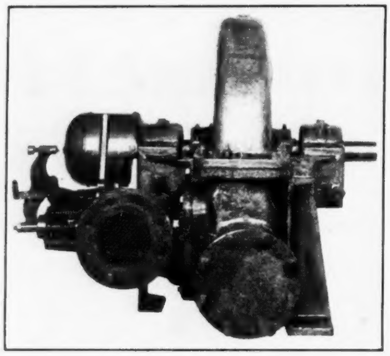
Triple Service Tire Vulcanizer

IN THE tire vulcanizer pictured, numerous manual operations have been combined into a single mechanical unit designated as a "3 in 1 Master Vulcanizer." The significance of this name refers to the fact that in this vulcanizing unit there are performed upon a tire the three operations of curing, rimming, and stripping from the mold. This triple service vulcanizer is operated by hydraulic pressure ranging from 350 to 400 pounds per square inch.

Referring to some of the structural and operating features of the mechanism, the curing ring is integral in the door half of the mold; while in the stationary half, the ring is attached to a piston having a travel from 6 to 7 inches. This movement provides for freeing the tire from the sta-



Akron Standard Vulcanizer



General Electric Steam Turbine

tionary half of the mold, eliminating completely the need for tools to remove the cured casing.

On the end of the piston is placed a breech that performs the rimming operation after the door is closed by the operator sufficiently to permit the engagement of the breech lock, which completes the operation of rimming the tire.

The use of this vulcanizer is a great aid to the efficiency of molding operatives because it eliminates effectually the exhaustion by physical effort which is a real cause for inefficiency. The Akron Standard Mold Co., Akron, O.

Laboratory Mixer

A HEAVY duty laboratory kneading and mixing machine is a most desirable piece of equipment in preparing test batches of cement of special quality and color either for use as adhesive material or for experimental trial on the spreader.

The mixing machine has a capacity of two gallons and is well adapted for making water dispersions of rubber and for production on small lot special orders. The mixer is driven by a 1 or 2 h.p. motor for A. C. or D. C. The trough, holding 3½ gallons, has single or compound gears and tilts for emptying. The lower half can be either plain or jacketed for steam or water.

The driving mechanism comprises a worm gear reducer smooth and silent in operation. The lubrication is practically automatic and the entire upkeep of the mixer very economical. The trough of the machine is in two sections, bored and finished inside, and contains two helical cast steel blades. The floor space over-all measurements are: length 33 inches, width 29 inches, height 21½ inches, and raised to empty 30 inches high. Charles Ross & Son Co., 148 Classon Ave., Brooklyn, N. Y.

Steam Turbine

A NEW small mechanical drive steam turbine is here pictured. It is intended for running fans, pumps, and similar industrial equipment and is designed for operation at steam pressures up to 250 pounds and speeds between 1,200 and 4,000 r.p.m.

The machine is a single stage, impulse type turbine with two rows of revolving buckets and an intermediate row of stationary buckets. The frame of the turbine is made of a special cast iron containing a percentage of steel for increasing the strength. The machine is equipped with a centrifugal governor mounted on the end of the shaft, which operates the balanced steel governor valve. The bearings are babbitt lined, ring oiled, and arranged for water cooling.

By limiting the range of conditions under which this turbine is operated, it has been possible to decrease the length and width, making it a very compact unit with a considerable saving in weight.

The turbine is supported at the center line to permit expansion without affecting the shaft alinement. It is equipped with speed regulating and emergency governors and is fitted with carbon shaft packing. The pipe connections are made to the lower half of the turbine to facilitate opening for inspection.

The chief advantages of this machine are its simple and rugged construction, resulting in efficient operation and a high degree of reliability. General Electric Co., Schenectady, N. Y.

English Forcing Machine

AMONG advanced designs of forcing machines the 6-inch model here illustrated is deservedly popular. It has fully enclosed gears, driven by a 30 h.p. variable speed A.C. motor having a speed ratio of 3 to 1. When constant speed motors only are available, enclosed change speed gears of 2 to 1 and 4 to 1 are supplied. The machine also is equipped with an enclosed variable speed conveyer belt drive.

The machine head is of strong and massive design, cast in one piece and machined at one setting to insure perfect alinement for the stock screw and shaft. The screw barrel is semi-chilled and finished by grinding and is completely surrounded by a temperature regulating chamber, fitted with thermometer. The feed pocket accommodates a single feed roller driven by gears at a definite speed ratio to the screw and is fitted with an adjustable steel scraper which keeps the roller perfectly clean.

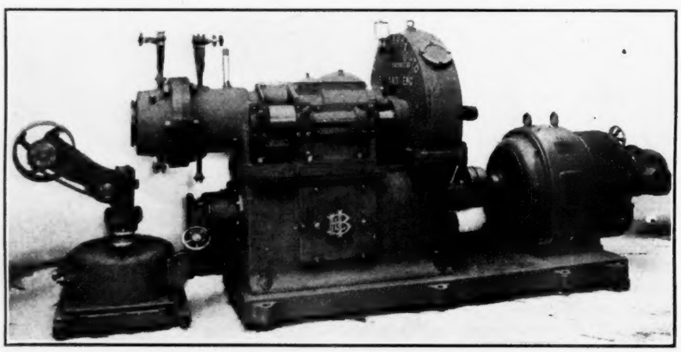
The screw is made from special high tensile steel and cut with threads of developed contour capable of giving high compression without slip or undue frictional losses. A heavy duty ball thrust bearing, which absorbs the thrust of the screw, is mounted on the screw shaft and held in position by a long sleeve bush bearing flanged on its outer end and securely fixed by screws to end of the cylinder head. This bush bearing also serves as a bearing for the driving wheel, taking all tooth strains and eliminating any eccentric action of the screw.

All gears are machine cut with double helical or straight teeth of correct pitch and extra width to insure smooth and silent running and long service. All shafts are supported in long ring oiling or ball journal bearings as required. The base of the machine contains oil wells for lubricating the intermediate speed reducing wheels.

Two types of die boxes are made for these machines: the straightway for solid and tube stock, having hollow fittings for use with compressed air chalking device; and the side-delivery type for covering cables, hose and other goods. Both types of die boxes are prepared generally for steam heating but electrical heating features are supplied as required.

The conveyer belt equipment has a friction operated variable speed motion driven by silent chain from the shaft coupled direct to the motor and has a speed ratio of 3 to 1 controlled by handwheel shown on the right hand of the gear; while the horizontally inclined handwheel in the center is for starting and stopping. Ball journal and ball thrust bearings are employed on the high speed shafts.

The machine is simple to operate; and although its production is somewhat less than the modern screw type machine of equal die capacity, the advantages stated are features of greater importance than speed. Iddon Brothers, Ltd., Leyland, Lancashire, England.



Iddon Six-Inch Forcing Machines


New Goods and Specialties


Rubber Improves Golf Club Head

AGAIN the superior qualities of rubber over other materials are demonstrated. This time it is with golf clubs. For resilience is not possible with wood. So the Schavolite Golf Corp., 16 W. 45th St., New York, N. Y., in designing its clubs for greater distance used rubber. Its molded composition head golf clubs are molded under tremendous heat and pressure and contain a portion of rubber resulting in greater resilience. The weight is thrown forward to the point of contact with the ball, where it offers increased hitting force. No lead weight is used, thus avoiding the undesirable twist which causes slices and pulls when the ball is hit anywhere except at the exact center of the face. Perfect balance, regardless of the club length or weight, is uniformly obtained through proper distribution of the weight at the head.

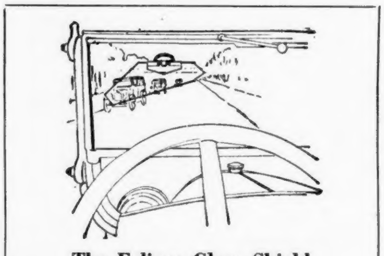
These clubs are officially approved by the United States Golf Association. The clubs are guaranteed against breakage and are impervious to moisture. They can't dent, chip, warp, or break. They are equipped with true temper steel shafts and have bright chromium, black, nickel, or tanned celluloid finishes. Their grips are of highest grade tacky calf skin.

Sectional Illustration of Schavolite Molded Head Clubs

Suction Cup Holds Anti-Glare Device

TO CONTROL approaching headlights, the area in which they move must be known. The general driving public could not learn this from observation; hence the inventor of the Eclipse Glare Shield experimented and found this area definite and limited, about 6 inches long and ⅛-inch wide, as seen from the windshield; the headlights move at an angle from the center of the road to the left. This accessory was designed with its lower edge having that same angle and parallel to the lights. It is adjusted on the windshield so that its lower edge is above the lights with its right end over the center of the road. The slightest movement of the head upward shuts off approaching lights.

This device fastens on the windshield with a sturdy vacuum suction cup made of molded rubber. A piece of colored celluloid or similar material forms the anti-glare feature, and the two parts are held together by a small metal hinge which operates in such a way that the device can be raised or lowered with one hand while driving with the other. G. H. Bennett, 1046—50th St., Woodside, L. I., N. Y.



The Eclipse Glare Shield

Radiator Testing Plug

THE THERMOID COMPANY, Trenton, N. J., has acquired the patent rights on a rubber plug that greatly simplifies the testing of a radiator core for leaks. The purpose of the plug is to close temporarily the openings of the radiator while it is being filled with compressed air. The radiator is then immersed in a tank of water, and the presence of leaks is detected by the escape of air. The principle is the same as that used for testing an inner tube.

Thermoid Rubber Plug

This plug is built with a collar or flange which, while elastic enough to permit the plug to be drawn over the inlet or outlet tube, grips tightly about the neck of the opening. Thus the plug is kept firmly in place.

Thermoid radiator plugs may be purchased individually or in sets of thirteen different sizes to fit practically any size of radiator.

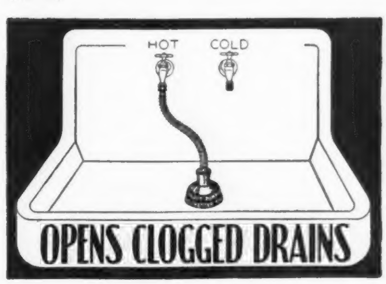
Rubber Securely Holds Margarine Mixer

FOR attaching it quickly and securely to a table or like support, and as readily removing it, a new household device for mixing margarine with coloring matter (commonly forbidden by law to manufacturers) has four rubber vacuum cup supports. The butter substitute mixing is done with three blades whirled with a handle inside a two-part cylindrical container, hinged at one side. The device may also be used for other culinary purposes. Min-et Products, Inc., 819 E. 62d St., and Kirkhill Rubber Co., 5811 S. Hoover St., both of Los Angeles, Calif.

Water-Pressure Force Pump for the Home

KITCHEN workers are often hampered by clogged sink drains. But now comes a device, the Scott water-pressure force pump, to obviate this difficulty. It is made of a special grade of rubber, protected by a flexible wire wrapping that will withstand scalding water.

To operate, connect to hot or cold water faucet, turn on the full force of water, and place the force cup over the sink drain. Press down until the center of the cup touches the drain where it will be held by suction. The force of water running through the cup will remove any substance which may have become lodged in the trap. Using this pump once a week keeps the sink trap in sanitary condition. The pump screws on threaded faucets, but by attaching a Scott faucet adapter to the faucet, the pump may be used on any type. This household appliance bears the approval of *Modern Priscilla*. Scott Pump Co., 645 Atlantic Ave., Rochester, N. Y.



Editor's Book Table

New Publications

"Engineering Achievements — Westinghouse Electric & Mfg. Co., 1930." In this 40-page reprint from *The Electrical Journal*, January, 1931, the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recounts many notable achievements in science and engineering that mark the advance of those great tendencies which make electrical progress so full of interest.

"Airubber Equipment." New York Rubber Corp., Beacon, N. Y. This twenty-page catalog, with its four-page insert, illustrates and describes a wide array of Airubber life preservers, swimming floats, boats, mattresses, and cushions.

Book Reviews

"Gummi-Kalender, 1931." Jahrbuch der Kautschuk-Industrie. Ein Hilfsbuch für Kaufleute, Techniker, Händler und Reisende der Kautschuk—, Asbest-und Celluloid Branche. Edited by Ernst A. Hauser and Kurt Maier. Published by Union Deutsche Verlagsgesellschaft Zweigniederlassung, Berlin, S. W. 19. Cloth, 330 pages, 3½ by 5½ inches.

This book, intended as pocket guide for merchants, technicians, dealers, and salesmen of the rubber, asbestos, and celluloid industries, has been carefully revised and condensed without sacrificing value of content. Mr. Hauser edited the part dealing with technology and has brought the chapter on research and the use of latex up-to-date. The newest specifications for rubber and asbestos goods, hose for mining and pressure fire hose also are included.

Kurt Maier is responsible for the data on the economical side of the industry covering the crude rubber market, Associations and Unions, factory regulations, conditions of delivery, including conditions imposed by the Imperial Railways for the supply of hose and other technical goods. The tables are assembled in a special third part.

The editors, ever anxious to raise the standard of the Kalender, plan to issue a completely revised edition next year and hope to receive valuable suggestions from users of the book.

"Proceedings of the Thirty-third Annual Meeting Held at Atlantic City, N. J., June 23-27, 1930." Vol. 30, Parts I and II. American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa. Cloth. Illustrated, subject and author indices. Part I, 1,336 pages; Part II, 1,085 pages.

Part I comprises committee reports, new and revised tentative standards, and tentative revision of standards. Among the tentative methods of test of special interest to rubber chemists and rubber technologists are those on the testing of insulating materials and textiles.

Part II comprises a group of papers on rubber transmission belting and one on flexing tests of pneumatic tire carcasses.

"Bulletin of the National Research Council." January, 1931. No. 81. Industrial Research Laboratories of the United States, including consulting research laboratories. Fourth Edition, revised and enlarged. Compiled by Clarence J. West and Callie Hull for the Research Information Service, National Research Council, United States. Published by The National Research Council of The National Academy of Sciences, Washington, D. C., 1931. Paper, 267 pages, 6¾ by 9¾ inches. Triple indexed. Price $2.

This book contains an alphabetical list of about 1,625 laboratories, a list of more than 1,900 directors of research, a geographical index, and a subject index. The laboratories listed show an increase of 60 per cent over those listed in the third edition of 1927. Laboratories connected with federal, state, or municipal governments or with educational institutions have been excluded from this survey.

Is Hedging Complete Insurance?

HEDGING, theoretically, is an operation that affords complete protection against fluctuations in the price of raw materials. Practically, however, the process is not so simple.

For hedging to be a success the price of finished goods should move up or down with the price of raw rubber. The price of finished goods actually advances much more slowly than the rise in the cost of the raw material. Some manufacturers adhere to the regrettable policy of guaranteeing prices of their finished articles. In these instances the manufacturer will lose more on his hedge than he gains in his actual transactions of purchasing raw rubber and selling the finished product.

Another test of the effectiveness of the hedging contract to the manufacturer depends on what percentage of the total cost of his product is contained in his raw material. If labor, transportation, or other miscellaneous overhead constitute the largest items in the cost of his completed product, the protection realized by hedging the small amount of raw material required is helpful only in the proportion that his raw material costs bear to his finished costs.

A more technical reason for incomplete insurance from hedging is that differences are sometimes registered in the prices in the futures market and those in the cash market. The normal spread between spot prices and futures contracts is the difference in storage charges, interest on capital, etc. The difference recently amounted to about 10/100 of a cent per pound for each month. For instance, if January were selling at 10 cents, April should be selling at 10.30 cents. With such an equalized spread the hedge purchases and sales would cancel each other.

Suppose that April, selling at a discount, was quoted at 10.10. The manufacturer loses 20/100 of a cent on each pound of rubber he hedges. He bought rubber for cash, and sold a future contract at a discount. It would work the other way too, so if the future contract were selling at a premium, say 10.50 cents, the manufacturer would profit by 20/100 of a cent per pound in the rubber he hedged.

What are the causes of a lack of parity between spot and future rubber prices? Several reasons explain this condition, and we shall outline a few of them.

Dealers may oversell rubber for forward shipment not knowing how much has already been sold. If a shortage of rubber is indicated, there probably would be a rush to cover these short sales with the result that nearby months would be bid up to a premium while distant months would remain less active and lower in price.

In an advancing market manufacturers may buy rubber to insure securing the quality they desire, but they will hedge heavily in the future months. Their actual purchases strengthen the price of spot rubber while their hedge sales weaken the price of the future contracts.

If business conditions are uncertain with the general price level receding each month, the result of these conditions may be reflected in the lower price of future contracts.

Finally, a low supply for delivery might help to advance future prices over spot prices while a heavy supply might depress future contracts in comparison with spot sales.

All these things make hedging a more difficult operation than appears at first sight. Protection is given to be sure, but the degree of protection depends largely on the skill with which the hedging contracts are employed. But this condition is not uncommon in business. Obviously, if money could be made by following a certain formula, everyone would be successful. The battle of wits is what puts zest into the game and gives business an attraction that would be sorely missed by intelligent men.

Airplane Tires on Cars

That larger air-containing sections of tires will in the near future be fitted to smaller diameter wheels is the belief of a British expert. One possibility is the fitting of automobiles with tires set directly on hubs, with air pressure as low as 7½ to 12½ pounds, and very similar to tires used on airplanes.

The Rubber Industry in America

OHIO

Institute for Rubber Research

Prof. H. E. Simmons, head of the Department of Chemistry, University of Akron, advocates the establishment of an institute for rubber research wherein the rubber industry of the United States may combine its research activities under unified direction. The proposed institute would make possible coordinated study of the chemical problems of the industry and thus eliminate the expensive duplication of research now taking place in the various laboratories of a great many rubber companies.

Among unsettled rubber problems the solution of which would be of great technical and economic importance to the industry Prof. Simmons cites those involved in vulcanization, and synthesis of rubber. His suggestion is backed by Akron University and has the approval of many rubber executives.

The realization of the plan, however, will be delayed until business conditions are more favorable for financing the estimated cost of $300,000.

Wishnick-Tumpeer, Inc., 251 Front St., New York, N. Y., has opened an office at 523 Guardian Building, Cleveland, in charge of Julius Tumpeer, vice president. Telephones: Cherry 0583 and 0584. Stocks for the convenience of the Ohio trade will be maintained at both Akron and Cleveland.

R. W. Brown, head of the engineering research laboratory, Firestone Tire & Rubber Co., Akron, at the suggestion of Dr. F. A. Moss, a George Washington University psychologist conducting fatigue tests, has developed a device to test man power and fatigue.

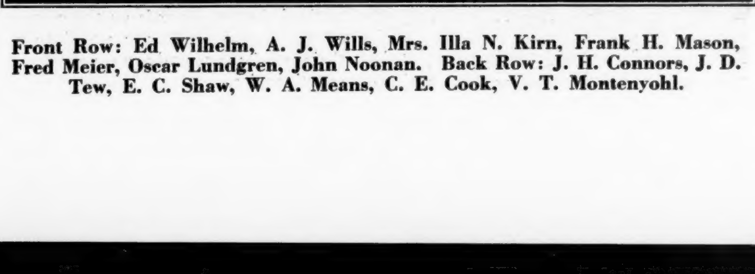
The B. F. Goodrich Rubber Co., Akron, through P. J. Kelly, advertising manager, has announced that M. G. Huntington, formerly of the sales promotion staff, has been made sales promotion and advertising manager of the Diamond and Brunswick divisions of Goodrich. He was with the Miller Rubber Co., Akron, before joining the Goodrich organization. Mr. Huntington succeeds W. P. Marquam, who resigned to join Henri, Hurst & McDonald Advertising Agency, Chicago, Ill.

Paul R. Mahoney, vice president of the International B. F. Goodrich Co., sailed recently on a world business trip to visit Hawaii, Japan, the Philippine Islands, Siam, British Malaya, the Dutch East Indies, British East Africa, France, Italy, England, Denmark, Norway, and Sweden. He will return to Akron July 1.

Standard Steel Works Co., Burnham, Pa., through General Sales Manager R. Nevin Watt, has announced that since January 1, 1931, it has handled direct with the rubber trade the sale of its products, formerly conducted by the Southwark Foundry & Machine Co. The Standard company has appointed S. S. Lewis its sales representative, with offices at 703 United Building, Akron. The concern manufactures tire molds and bead rings, locomotive tires, rolled steel wheels, steel forgings and castings, flanges, circular rings, shafts and springs.

C. E. Myers, for eighteen years superintendent at the Kuhlke Machine Co., has formed the Akron General Machine Co., 305 Water St., Akron. The concern is equipped as a machine and repair shop to save time for Akron manufacturers by doing repairs there. Previously they had to send to the original makers in other cities. The machine force of the new company is composed of skilled workmen who have worked on most of the machines in the local factories.

Goodrich Old Timers



Front Row: Ed Wilhelm, A. J. Wills, Mrs. Illa N. Kirn, Frank H. Mason, Fred Meier, Oscar Lundgren, John Noonan. Back Row: J. H. Connors, J. D. Tew, E. C. Shaw, W. A. Means, C. E. Cook, V. T. Montenyohl.

"Pudge" Konrad

Organizer of Konrad Co.

At the head of C. O. Konrad Co., manufacturers' representative for rubber cutting machines, water works equipment, and steam supplies, Akron, O., is an energetic business man, a typical go-getter—Charles O. Konrad. But who knows him other than as "Pudge"?

He was born in Akron forty years ago and attended the local public schools and Akron University. Here he excelled in athletics.

In 1910 he joined the production department of The B. F. Goodrich Co. After four years he entered the adjusting division of The Goodyear Tire & Rubber Co., but later was transferred to the sales division, with a territory as far east as Rochester, N. Y., and as far west as Omaha, Neb. With the exception of a short time in the U. S. Army, Mr. Konrad was with Goodyear nearly seven years. Then in 1921 he went to The Miller Tire & Rubber Co. in its production division and remained there until five years ago, when he organized his own company.

New General Manager of Adamson Machine Co.

The directors of The Adamson Machine Co., Akron, announced recently the appointment of Clyde B. Mitchella as general manager. For the past five years he was chief engineer of The Republic Rubber Co. of Youngstown. Prior to this position he was in the Engineering Department of The B. F. Goodrich Co.

Mr. Mitchella received his technical training at The Case School of Applied Science, and his elementary education at the Akron public schools.

FINANCIAL

Goodyear Report—1930

Net earnings of The Goodyear Tire & Rubber Co. in 1930 were $9,912,233, equal to $3.16 a share on the common stock after the payment of the preferred dividends.

In 1929 the company had net earnings of $18,614,374, equal after the preferred dividends to $10.23 a share on the common stock before a reserve for contingencies, and to $9.34 a share after the contingency reserve.

After $13,034,400 was provided for depreciation, consolidated earnings for 1930, before interest and discount charges, were $14,798,718. The net earnings included the contingency reserve of $5,000,000 provided out of the 1929 earnings in anticipation of fluctuations in raw material.

The consolidated profit and loss and earned surplus account for two years ended on December 31 follow:

	1930	1929
Net sales	$204,063,229	$256,227,067
Exp., Fed. tax., depr., etc.	190,910,570	233,914,052
Balance	13,152,659	22,313,015
Other income	1,646,059	2,690,140
Total income	14,793,748	25,003,155
Int. and other chgs.	3,497,637	3,688,969
Sub. divs.	1,388,848	1,449,812
Reserve of cont.	....	1,250,000
Bal. to surplus	9,912,233	18.614,374
Prev. surplus	26,638.615	19.344,736
Total surplus	36,550.847	37,959,110
Dividends and adjust.	12,754,890	10,823,371
Surplus Dec. 31	23,795,957	26,638,614

During 1930 the first preferred stock of the company was reduced 11,608 shares, and the first mortgage and collateral trust bonds were reduced $1,442,500 through the effective operations of the respective sinking funds.

Goodyear (California) Shows Loss

Goodyear Tire & Rubber Co. of California in its report for 1930 shows net loss of $203,899, after all charges, including $1,220,467 for plant and equipment depreciation and $468,000 reserve for loss on future delivery rubber commitments. Net profits in 1929 were $2,293,567; net sales in 1930, $20,018,568; and 1929, $26,233,596. Unit sales were higher in 1930 but at lower price levels. Funded debt was reduced $200,000 in 1930. Total assets were: 1930, $17,129,466.19; 1929, $19,893,784.38.

The B. F. Goodrich Co.

After the regular quarterly meeting of the Board of Directors of The B. F. Goodrich Co., held on February 4, 1931, the following financial statement was issued:

Consolidated net sales of the company for the fiscal year ended December 31, 1930, were approximately $155,000,000 compared with sales of $164,400,000 in the previous year. The company sustained a net loss for the year of approximately $8,400,000 after all charges including interest and depreciation. Inventories of raw materials were taken at the lower of cost or December 31, 1930, market prices. The year's operations were charged in creating a reserve to write down raw materials on commitment to December 31, 1930, market prices. The directors ordered a charge of approximately $1,800,000 against surplus account in order to write the cost of the material content of in process and finished goods to market prices as of December 31, 1930. This represents a departure from the past policy of carrying materials in finished goods at cost. The entire cost of issuing the $30,000,000 15-year 6 per cent convertible gold debentures was also charged against surplus.

Operations of Miller Rubber Co., Inc., were consolidated in the above results only during the period from February 17, 1930, during which time it operated as a subsidiary of The B. F. Goodrich Co.

The preferred dividend of $1.75 per share was declared payable April 1, 1931, to holders of record of the preferred stock of the company at the close of business on March 13, 1931.

The directors also approved the retirement of 11,880 shares of preferred stock in accordance with the provisions of the charter.

General Tire & Rubber Co.

Despite the generally depressed status of the rubber industry in 1930, the financial condition of the General Tire & Rubber Co. showed a decided improvement at the end of the fiscal year over the preceding year.

Inventory of raw material, stock in process, and finished goods shows a reduction of 28 per cent at the end of 1930, as compared with a year previous. This decrease is due to lower stocks, together with a write-down of approximately $1,000,000 on raw material during the year, because of much lower prices on crude rubber and cotton.

In spite of the depreciation of about $1,500,000 in inventory, there has been a decrease in surplus of only about $80,000 as compared with 1929, the statement shows.

With sales of approximately $25,000,000 in 1930 the company not only paid its regular preferred and common dividends in full but paid an extra dividend of 4 per cent on the common and set aside a fund, equal in amount to this extra dividend, to stabilize employment through the financing of out-of-season sales and loans to regular employes temporarily laid off.

Net profit of only 2½ per cent on the company's 1930 sales of approximately $25,000,000 is required to meet all of the regular dividend requirements on both preferred and common stock.

The financial statement for the fiscal year, which ended November 30, 1930, is as follows:

BALANCE SHEET

November 30, 1930

Assets		
Cash on hand and in banks	$1,329,656.78	
Notes and accounts receivable	4,704,597.65	
Inventory—raw, in process and finished goods	3,834,067.93	
		$9,868,322.36
Miscellaneous investments, mortgages, stocks, bonds and advances to dealers—less reserves		2,197,213.83
Land, buildings, machinery, equipment, etc.—less reserve for depreciation		2,701,564.76
Patents		1.00
Deferred charges		51,067.72
Total assets		$14,818,169.67
Liabilities		
Notes payable to banks		$1,950,000.00
Accounts payable—not due—including payroll		387,655.91
Reserve for federal income taxes		63,423.17
Reserve for insurance, accrued taxes, real and personal		252,419.63
Mortgages payable on branch property		91,700.00
Capital stock—preferred	$3,500,000.00	
Less treasury	237,300.00	
		3,262,700.00
Common	$2,500,000.00	
Less treasury	387,400.00	
		2,112,600.00
Surplus		6,697,670.96
Total liabilities including surplus and capital stock		$14,818,169.67

Eagle-Picher Lead Co.

The Eagle-Picher Lead Co. and its subsidiary, the Eagle-Picher Mining & Smelting Co., report a net loss of $1,919,465 for the year ended December 31, 1930, after writing down inventories, setting up a reserve for further losses, and establishing a reserve for doubtful accounts. That result compares with a profit of $1,215,812 in 1929, equal to $1.16 cents a share on the $20 par value common stock after dividend requirements for the 6 per cent preferred stock.

Report Footwear Stocks Promptly

The Department of Commerce will make two surveys of rubber footwear stocks in dealers' hands; the first, as of March 1, to determine the stocks of waterproof rubber footwear; and the second, as of November 1, to determine the stocks of canvas rubber-soled shoes held by dealers. The success of these surveys, that are invaluable to the industry, depends on the cooperation of the dealers, who are urged to report their stocks promptly on receipt of the questionnaire.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	Com.	$1.00 q.	Feb. 16	Jan. 31
American Hard Rubber Co.	Pfd.	$2.00 q.	Apr. 1	Mar. 16
American Hard Rubber Co.	Pfd.	$2.00 q.	July 1	June 15
American Hard Rubber Co.	Pfd.	$2.00 q.	Oct. 1	Sept. 15
American Hard Rubber Co.	Pfd.	$2.00 q.	Jan. 2	Dec. 18
Baldwin Rubber Co.	Cl. A	$0.37½ q.	Mar. 31	Mar. 20
Boston Woven Hose & Rubber Co	Com.	$1.50 q.	Mar. 16	Mar. 2
Dunlop Tire & Rubber Co., Ltd.	Pfd.	$1.75 q.	Jan. 2	....
B. F. Goodrich Co.	Pfd.	$1.75 q.	Apr. 1	Mar. 13
Plymouth Rubber Co.	Pfd.	$1.75 q.	Jan. 15	Jan. 9
Raybestos-Manhattan, Inc.	Com.	$0.65 q.	Mar. 16	Feb. 28

MIDWEST

U. S. Rubber Co. Tire Dept. Activities

Cadwell, Director of the Products Development

Sidney M. Cadwell has been appointed Director of the Products Development Division of the Tire Department of the United States Rubber Co., Detroit, Mich. He comes from the U. S. Laboratories, Passaic, N. J., with which he has been connected for the past eleven years. The latter part of this time he was assistant director of its development department. Specializing in the aging of rubber, he had much to do with the development of VGB, the first rubber antioxidant to be marketed. He has also assisted in developing a large number of vulcanization accelerators and several new vulcanization processes.

Sidney M. Cadwell is a member of the American Chemical Society and the American Institute of Chemical Engineering. He has been a member of the executive committees of the New York Rubber Group and the Rubber Division of the American Chemical Society. He is a member of Sigma Xi and Gamma Alpha, honorary scientific fraternities, and has served as counselor, vice president, and secretary of the national Gamma Alpha organization. He is a graduate of the University of Chicago with the degrees of Bachelor of Science and Ph. D.

Sidney M. Cadwell

New Manager of the Tire Service Department

F. L. Krause, with the U. S. company for the past fourteen years, has been made manager of its Tire Service Department, Mr. Simpson also announced. The Tire Service Department is a reorganization of the former technical service division, headed by A. K. Dill, now director of sales of bicycle tires, sundries, and airplane tires. Before his recent appointment Mr. Krause was assistant to Mr. Dill. Mr. Krause's first position with this company was as manager of its repair department in its Syracuse, N. Y., branch. Later he was an adjuster there until December, 1926, when he was transferred to the general offices in Detroit. Here he was placed in charge of its technical service school, where service men sent by dealers from all parts of the country are trained in the latest methods of tire repair and service.

New Advertising and Sales Promotion Manager

Frank S. Harkins has been appointed manager of advertising and sales promotion of the U. S. Tire Department, according to General Sales Manager L. M. Simpson. Joining the U. S. organization about a year ago, Mr. Harkins served as Detroit district manager and later as sales promotion manager, which position he will retain in addition to his duties as advertising manager. Prior to his U. S. Rubber connection he was with B. F. Goodrich Rubber Co., Akron, O., as manager of national advertising and later as manager of its San Francisco branch. In outlining the advertising policies to be followed, Mr. Harkins stated that the company's advertising would provide a strong support for its merchandising plans and give the dealer the fullest possible factory cooperation.

F. S. Harkins

National Association of Waste Material Dealers, Inc., will hold its eighteenth annual convention at the Congress Hotel, Chicago, Ill., March 16, 17 and 18. On the last day the Salvage & Reclamation and the Scrap Rubber Divisions will hold their meetings. Matters of interest to scrap rubber dealers will be considered. It is hoped to have the president of one of the large rubber manufacturing concerns of the country address the meeting on the immediate and future outlook for scrap rubber. All members interested in scrap rubber should make a real effort to attend. These sessions will be followed by the annual meeting. The convention will close with the customary banquet.

C/M Co. of America, whose outstanding product is caoutchouc-mousse (rubber foam), has moved to 190 N. State St., Chicago, Ill.

Ford's Plans for Brazilian Plantations

The Ford Motor Co., Detroit, Mich., states that its rubber plantations in Brazil will not be abandoned. In fact, many new developments are planned, and work is ahead of schedule. To carry out the distinctly new plan contemplated, a party of Ford Motor Co. officials recently arrived in Brazil from the United States.

Those arriving include W. E. Carnegie, chief of the company's accounting department, at Dearborn, and V. J. Perini, manager of the company's plant at Iron Mountain, both in Mich. Accompanying them are Archibald Johnston and Mrs. Johnston. Mr. Johnston, for some time a member of the company's engineering staff at Dearborn, will become manager of the Para office. John Rogge, at present an assistant in charge of operations at Boa Vista, will assume managerial duties on the plantation. J. S. Kennedy, the present manager, will return in the near future to the United States.

By its new plan the company hopes that the plantation, apart from that portion necessary to planting and to operation, will become a self-maintained and self-governed municipality with its own stores, schools, churches, etc., similar to the Ford community at Dearborn.

As Mr. Carnegie says, "In a word, the plan is one of expansion by which the Brazilian people and the company will, we believe, be brought together in a closer union of interests."

The National Tire Dealers' Association and **The Rubber Manufacturers Association** are making much progress in their efforts to bring about the long-hoped-for cooperation between tire manufacturers and tire merchants. The intensive development of membership in the N. T. D. A. will be fostered by the manufacturers through their association and their sales departments, and every cooperation given to the newly elected N. T. D. A. secretary-manager, Norval P. Trimborn, who has achieved a reputation for his work with Chicago dealers and also for conducting the Truck Tire Division meetings at the annual conventions.

Martin J. Barry, N. T. D. A. president, in discussing the work planned for 1931 said, "We hope that dealers interested in organizing will get in touch with Mr. Trimborn at the new offices of the N. T. D. A., at 100 North La Salle St., Chicago. He will arrange to help them just as rapidly as possible."

Cut Crude Rubber Freight Rate

Reduction from 47 cents per hundred pounds to 40 cents per hundred pounds in the railroad freight rate on crude rubber from the port of New York to Akron, effective March 1, was announced recently by W. R. Hubbard, foreign trade manager of the chamber of commerce.

CANADA

The National Shoe Retailers Association at the recent convention in Toronto, Ont., passed among the resolutions one urging all rubber manufacturers to follow "the precedent already established in other lines of business and take such steps as may be necessary to standardize the size and strength of rubber footwear containers." The committee appointed in 1930 to investigate the practicability of cooperative buying among shoe retailers presented its report, which recommends pooling retailers' rubber footwear orders through an existing wholesale organization. The committee believed it wiser to utilize existing wholesale facilities of established reputation than to attempt to build up a wholesale supply house of its own. The result was the passing of another resolution "that this convention reaffirms its approval of the principle of cooperative merchandising and recommends that the Committee that has been studying this question be enlarged and given power to take definite action on this subject in the immediate future."

Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., through President E. W. BeSaw reports a satisfactory year, with every indication of a very substantial increase in 1931, which will be due to greater sales of replacement tires.

Canadian Bicycle & Sporting Goods Association recently held its fourteenth annual convention at the Royal York Hotel, Toronto, Ont. The following rubber firms had exhibits: Dunlop Tire & Rubber Goods Co., Ltd.; North British Rubber Co., Ltd., both of Toronto; Canada Cycle & Motor Co., Ltd., Weston; and Guelph Elastic Hosiery Co., Ltd., Guelph, all in Ont.

Perfection Rubber Co., Ltd., has moved its head office from Montreal to Lachine, P. Q. A by-law ratifying the change was approved at a recent general meeting of Perfection shareholders.

The Kaufman Rubber Co., Ltd., Kitchener, Ont., has appointed Frank Hutchinson, formerly of Calgary, Alta., manager of its Lethbridge, Alta., branch.

Miner Rubber Co., Ltd., recently held a conference at its Maritime headquarters in Halifax, N. S., for its sales staff in New Brunswick, Nova Scotia, and Prince Edward Island.

North British Rubber Co., Ltd., Edinburgh, Scotland, through its branch at Toronto, Ont., is introducing to the Canadian bicycle trade its "electro deposited bicycle tube." The company claims it a "triumph of science," in that rubber latex is deposited by electricity on mandrels, forming inner tubes of the required thickness, which are seamless, perfectly homogeneous, and without a grain.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont. President and General Manager C. H. Carlisle recently was elected president of the Toronto Board of Trade. G. L. McCrea is manager of the Goodyear Mechanical Goods Sales Department.

Canadian Rubber Association

At the annual meeting of the Rubber Association of Canada, held in the Mount Royal Hotel in Montreal on February 9, the following officers were elected: C. A. Jones of the Seiberling Rubber Co., Ltd., Toronto, president, succeeds W. A. Eden of the Dominion Rubber Co., Ltd., Montreal; J. H. Coffing, Jr., was elected vice-president; C. N. Candee, treasurer, and H. C. Jeffries, assisting treasurer. Directors include C. A. Jones, W. A. Eden, F. L. Freudeman, John Westren, E. S. Sargent, W. H. Miner, C. H. Carlisle, E. W. BeSaw, and J. H. Coffing, Jr.

In his annual report, A. B. Hannay, manager and secretary of the Association, brought out the fact that after nine successive and substantial annual increases in volume of output, the rubber industry of Canada stumbled last year for the first time since 1921. The world-wide depression curtailed the production and the merchandising of all varieties of rubber goods. There was a falling off of the sales of Canadian tires, footwear, belts, hose, matting, packing, bottles, garments, and gloves both in Canada and abroad. Not only were production and sales poundage less than for many years but selling prices are now the lowest in history.

The Hon. W. A. Gordon, Minister of Immigration and Colonization and Mines, was the principal speaker at the annual dinner held on the evening of February 9, at the Mount Royal Hotel. He stated, among other things that the Canadian rubber industry had been able to make enviable progress in the face of vigorous competition from the south. W. A. Eden, the retiring president, acted as chairman at the dinner.

Gutta Percha & Rubber, Ltd., Toronto, Ont. For several years during the week of the Motor Show tires have adorned windows of Montreal merchants, inviting passers-by to visit the Show. The tires have been contributed by various manufacturers and the space donated by merchants. This year a novelty was introduced by the Gutta Percha firm in their tires: a view of the Canadian National Terminal development in Montreal, added as a symbol of progress and prosperity in 1931. The Gutta Percha rubber company recently suffered damage estimated at $90,000 from a fire in its building at St. John, N. B.

Canadian Webbing Co. is being established in Kingston, Ont., by The Everlastik Co., Inc., Chelsea, Mass., U. S. A. Production will start within the next few months. B. T. Martin, president of the American company, has asked to be made a member of the Canadian Manufacturers' Association, and he intends to accompany the Canadian delegation of the association, going in March to visit the British Empire Trade Fair at Buenos Aires, Argentina. Mr. Martin has also become a member of the Kingston Chamber of Commerce.

Lee Schoenhair, manager aviation department, The B. F. Goodrich Rubber Co., Akron, O., U. S. A., was a guest speaker at a recent meeting of the Montreal Advertising Club. He was introduced by Mr. Needles, sales manager, Canadian Goodrich Co., Ltd., Kitchener, Ont. Accompanying Mr. Schoenhair was Guy Gundaker, Jr., manager of the Sales Promotion Department.

The National Association of Purchasing Agents will hold its annual convention and Informashow in Royal York Hotel, Toronto, June 8 to 11.

Dispersed Rubber Paper Sizing

In a new process for making rubberized paper, moisture is first removed from a web of paper pulp, a top size containing dispersed rubber is applied, and the web is dried to form a sheet.

Tire Production and Shipments

Shipments of pneumatic casings for December were 3,361,200, an increase of 18.6 per cent over November and 3.8 per cent over December a year ago, according to statistics released by the R. M. A. This organization reports pneumatic casings on hand December 31 as 9,033,438, a decline of 6.2 per cent under November 30, and 23.9 per cent below December 31, 1930.

Shipments of pneumatic casings in the year 1930 exceeded production by 5.3 per cent, whereas during 1929 the excess was slightly less than 1 per cent.

Production of pneumatic casings for December is placed at 2,814,086, an increase of 6 per cent over the November figure of 2,653,861. Production for December a year ago amounted to 3,057,271 tire casings.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	Inquiry
1322	Manufacturer of balloon ringing machine.
1323	Who sells ground tire scrap rubber.
1324	Manufacturer of dipping machines.
1325	Manufacturer of machinery for making tire patches.
1326	Manufacturer of steel mill rolls.
1327	Manufacturer of diaphragm packing.
1328	Eastern manufacturer of red swimming tubes.
1329	New England manufacturer of washers for rubber heels.
1330	Source of supply of rubber foam.
1331	Manufacturer of "Durabla" high pressure steam jointing.
1332	Manufacturer of varnished rubber tubing.
1333	Manufacturer of sponge rubber slabs 48 by 60 inches and 54 by 72 inches ¾- or ⅞-inch thick.
1334	Manufacturers of rubber tile.
1335	Manufacturers of rubber vacuum cups for fastening corners of rugs to floors.
1336	Manufacturer of pneumatic testing machine.
1337	Manufacturer of black cloth for shutters of cameras.
1338	Manufacturer of solid rubber wheels for toys.
1339	Manufacturer of gage thirteen inches deep.
1340	Manufacturer of hard rubber tubing.
1341	Manufacturer of parachute harness.

PACIFIC COAST

United States Rubber Co. has, with the acquisition of control of the Samson Tire & Rubber Corp., Los Angeles, Calif., and the Gillette Rubber Co., Eau Claire, Wis., and operating in accord with the main plant in Detroit, Mich., practically evolved a tripartite arrangement that will result in the most effective production and distribution of tires and tubes. It is stated that within another month the force of 3,500 workers and the output in Detroit will be materially increased, the force of 1,800 and the present daily outturn of 12,000 tires at Eau Claire will also be soon expanded largely, and the production of 6,000 tires and 10,000 tubes daily at Los Angeles will probably be doubled by the end of 1931.

Directors added to the Gillette board are President F. B. Davis, Jr., Vice President L. D. Tompkins, and Chairman Wm. DeKrafft, of the finance committee of the U. S. company, all of New York; with R. B. Gillette, of Eau Claire, as chairman of the board. There will be practically no change in other personnel.

The Samson Division, U. S. Rubber Co., will supply not only all that section between the Rockies and the Pacific, but will also ship to some southern or gulf ports, the Hawaiian Islands, the Far East, all of Mexico, and the West Coast of South America. The Chevrolet assembly plant at Oakland, Calif., and the Ford assembly plant at Long Beach, Calif., will be among the larger consumer units. The Gillette plant will distribute mainly in the Northwest.

Sprayed rubber, a well-known product of the U. S. Rubber Co., is already being extensively employed at its Samson Division, and it is said to be probable that soon all of the latter's requirements of such material may be produced in Los Angeles.

Wright Rubber Products Co., Racine, Wis., states that business in rubber tiling and flooring is showing steady improvement on this coast. One of the larger installations made lately by the company has been the covering of the main ramp in the subway of the Pacific Electric Building, Hill St., Los Angeles, Calif., which provides exit for passengers of city and interurban streetcars. The new, grooved rubber tiles, fastened to a special concrete composition with spiralled-shank nails, replace old hard tiling that had worn so smooth as to measurably slow up the outpouring of passengers and also be unsafe.

Van Fleet-Freear Co., 557 Howard St., San Francisco, Calif., of which G. H. Freear is president, has been appointed by the United States Rubber Co. as distributer for the city and vicinity of the latter's rubber tiling and flooring. The U. S. company recently had an elaborate exhibit of its flooring products at the Palace Hotel in that city, as also at the Biltmore Hotel in Los Angeles.

Firestone Tire & Rubber Co. of California is running its factory in Los Angeles on double time shift and is steadily stepping up production. Reports from all branches in the coast field are said to be very encouraging, according to Lee R. Jackson, vice president and general sales manager of the parent Firestone company in Akron, O., who was a recent visitor at the Los Angeles plant. Vice President and General Sales Manager R. C. Tucker of the California company, who has just returned from an extensive trip through the Northwest, is also very optimistic about the prospects.

Cactus Mfg. Co., Inc., 2700 San Fernando Rd., Los Angeles, Calif., which has been making studded tire boots and patches and "Kactus Kid" auto accessories, is now making and marketing link-constructed floor matting in standard sizes and per specifications. The material used is pulled truck tire fabric, diecut, and tinted in three colors. The president and general manager is C. J. Evans, who founded the business in 1922.

Slusser Safety Award

Goodyear Tire & Rubber Co., Los Angeles, Calif., which has been operating on three-time shifts since the first of the year, reports business steadily improving. Much enthusiasm over the outlook is said to have been expressed at the dealer conferences held late in February. A new $500,000 super-service station of Motor Tires, Inc., which has sixteen stores of a similar kind in the Los Angeles area, all of which deal exclusively in Goodyear products, was formally dedicated February 13. It is said to be the largest tire-selling station in the country, and is located at 1415 E. Ninth St.

The Slusser Safety Trophy, an award sponsored by C. C. Slusser, vice president of the Goodyear company, was won by the Los Angeles factory, for making the best safety record of all the Goodyear factories in the year 1930. The illustration shows the trophy just received at the Los Angeles factory, where it was given an enthusiastic reception. The young lady is Bee Quayle of the bead room. General Superintendent L. B. Tomkinson of the Los Angeles plant is at the right.

Pacific R. & H. Chemical Corp., subsidiary of the Roessler & Hasslacher Chemical Co., New York, reports that business at its rubber reclaiming plant at El Monte, Calif., is gradually improving. The plant produces standard whole tire reclaim, has up-to-date equipment throughout, and a daily capacity of ten tons. F. S. Pratt is manager of the works.

W. J. Voit Rubber Co., 2619 Nevin Ave., Los Angeles, Calif., one of the busy rubber shops in the Southwest, is counting on a good business in 1931. Much equipment was recently installed. Products include sponge rubber cushions and other expanded articles, inflatable cushions and beach balls, matting, tread repair stock, and patented specialties. W. J. Voit is president; W. G. L. Smith, vice president; T. R. Edkins, secretary; and G. Foley, treasurer. M. B. Clark is superintendent.

© American Rubber Producers, Inc.

Officers and Staff of American Rubber Producers, Inc., Salinas, Calif.

Standing: Wm. H. Yeadle, Vice President; Dr. David Spence, Technical Director; Dr. Wm. B. McCallum, Chief Botanist. Seated: J. Miller Williams, Manager; Geo. H. Carnahan, President.

Dewey & Almy Chemical Co., Cambridge, Mass., has awarded contracts for erecting a branch at 4000 E. Eighth St., Oakland, Calif. The building will be two stories high and is expected to cost over $10,000.

Seiberling Rubber Co., Akron, O., according to its president, Frank A. Seiberling, who was a recent visitor on the Pacific Coast, will shortly have on the market a novel type of tire with what is said to be the deepest tread yet used on any tire, but made possible through the use of "breather holes" in the casing to prevent separation and overheating. A minimum increase of 50 per cent in mileage is promised. At a dealers' convention in Los Angeles a luncheon was tendered to Mr. Seiberling; arrangements were made by C. B. Reynolds, district manager, and B. C. Bronson, local manager and factory representative. Mr. Seiberling left on a business tour which will include a large part of the country.

Ralphs-Pugh Co., Inc., 530-532 Howard St., San Francisco, Calif., one of the largest retail distributers of rubber goods on the Pacific Coast, reports business as showing a decidedly improved tone, with excellent prospects for 1931. The company has been in business nearly twenty years and represents some of the leading rubber concerns of the country, such as the Acme Rubber Mfg. Co., Trenton, N. J.; Wilson Rubber Co., Canton, O.; Archer Rubber Co., Milford, Mass., and various others. W. J. Pugh is president; Irvin Holmes, vice president; and Isaac Ralphs, secretary and treasurer.

Pioneer Rubber Mills, San Francisco, Calif., announces that it has won the contract from the Los Angeles Fire Department for 30,000 feet of 2½-inch fire hose to be supplied during 1931 at the rate of 35 cents a foot, or about half the price that the hose cost a year ago. The low bid was made, it is explained, to keep the Pioneer factory at Pittsburg, Calif., busy in a quiet period and to alleviate unemployment. The highest bid received was that of 65 cents a foot.

Pacific Goodrich Rubber Co., Los Angeles, Calif., reports a gratifying improvement in tire orders from dealers throughout practically all its coast field, and a consequent quickening in all departments at its plant. General Sales Manager F. E. Titus announces the appointment of F. L. Hockensmith to fill the newly created post of district manager; his territory includes Southern California, Arizona, Western Texas, New Mexico, Nevada, and Utah. H. S. Wheeler, eighteen years with Goodrich, has been made general manager of the sixteen stores operated in Los Angeles by Goodrich Silvertown, Inc., with headquarters at 1422 S. Grand Ave.

A press helper fell into an open press and received injuries consisting of a fractured left leg, contusion, and sprain of back and chest, and also contusion and abrasion to his head. It is estimated that this employe will be disabled for 180 days. *Rubber Section News Letter*, N. S. C.

NEW JERSEY

Little change in the rubber industry took place throughout New Jersey last month. Mechanical goods production remains good at some plants, while at others it has dropped off. Factories, however, report fair activity in rubber footwear, soles, and heels. Some plants, moreover, are working on garden and fire hose for spring delivery. Hard rubber shows much improvement, but tire and tube orders have been curtailed. Production of rubber cloth has decreased a little.

Energetic Southwest Goodrich Distributer

Casting his lot with The B. F. Goodrich Co. sixteen years ago, and knowing no other employer before or since, F. L. Hockensmith, district manager of the Pacific

F. L. Hockensmith

Goodrich Rubber Co., subsidiary of the parent Goodrich concern in Akron, O., and stationed at Los Angeles, Calif., is known in the farwestern rubber trade as one of the most energetic distributers in the Pacific Coast area. Nor is anyone more popular in his field.

Mr. Hockensmith was born in 1890 in Wadsworth, O., and received his early education in the city grammar and high schools. After further training in Wittenberg College he entered Akron University and graduated in 1914 as a bachelor of science. In the same year he joined the selling force of the Goodrich company in Akron. He was an apt scholar, and it was not long before he was intrusted with a district managership for the big concern in Texas. When an assistant manager was needed for the Detroit district, Mr. Hockensmith was selected as the best available. So well did he acquit himself in that position that when a vacancy occurred in Los Angeles, he was at once chosen to manage that important branch. Quite recently he won the new post of district manager in the Southwest.

As a member of Beta Theta Pi fraternity and as a Mason and Shriner, Mr. Hockensmith finds a congenial outlet for much of his social energy, although it is also true that he enjoys few things better than business and social relations with his Goodrich associates.

State of New Jersey has saved about $2,000 on its 1931 contract for automobile tires because of the recent decline in crude rubber. The contract placed last July stipulated the State was to receive the benefit of any drop in prices during the life of the contract. Each tire is to carry a guaranty of 27,000 miles of service.

Joseph Stokes Rubber Co., Trenton, finds business good. Enough large orders have been received to keep the plant operating steadily during March and April.

Fulton Specialty Co., 128 Fulton St., Elizabeth, rubber goods manufacturer, suffered heavy damage on January 27 when flames gutted the four-story brick plant. About fifty hands are out of work as a result.

The Weldon Roberts Rubber Co., 18 Oliver St., Newark, has revised plans for altering a two-story brick factory building at 361 Sixth Ave. at a cost of $40,000.

Puritan Rubber Co., Trenton, N. J., received many new orders during the past few weeks, giving promise of a good spring business.

Rubber Manufacturers' Association of New Jersey held its mid-winter meeting and dinner on February 10 at the Trenton Club, Trenton. A. L. Viles, general manager of The Rubber Manufacturers Association, as guest speaker, gave an interesting talk on rubber.

Lambertville Rubber Co., Lambertville, reports little change in business during the past month. The plant is operating normally.

Whitehead Bros. Rubber Co., Trenton, states that business continues good, with bright prospects for the spring trade.

William J. B. Stokes, rubber manufacturer, and **Harry W. Roberts,** president of the Pierce-Roberts Rubber Co., both of Trenton, have contributed liberally to the Trenton Chapter, American Red Cross, for the drought relief fund.

The Thermoid Company, Trenton, finds that business is beginning to improve. President Robert J. Stokes is making a three-week business tour of the mid-west. James Wheatley, sales manager of the automotive division, is visiting the company's branches along the Pacific Coast. Thermoid announces changes in the personnel of the Woven Steel Hose & Rubber Co., which it recently acquired. Horace B. Tobin remains president, but Robert J. Stokes has been made vice president, and Joseph O. Baur, Thermoid secretary-treasurer, holds the same position with the Woven Steel Hose concern.

Pierce-Roberts Rubber Co., Trenton, reports quiet business during the past month.

Mercer Rubber Co., Trenton, experienced improved business during the past few weeks.

Murray Rubber Co., Trenton, states that business is picking up considerably. The company last month shipped many carloads of tires to agencies in the West and the Southwest.

OBITUARY

Dean of Crude Rubber Brokers

THE passing on January 21, after a short illness from penumonia, of Arthur Wallace Stedman, well termed the dean of American rubber brokers, severed another of the few remaining links between the present crude rubber trade and that operating under quite dissimilar conditions two score years ago; just as it also removed from the industry generally one of its ablest experts and most engaging personalities. Few men in the rubber business had more warm friends in this country and abroad than Mr. Stedman or did more in a similar period to promote the best interests of the industry. His aid was never besought in vain in public and private charities, and many commercial leaders gratefully acknowledge his counsel and helpfulness at the outset of their careers.

Mr. Stedman came of sturdy old New England stock; one of his ancestors founded the town of Brookline, Mass., in 1705. He was born in Boston, April 11, 1855, and received his early training in private schools. Next he was prepared at Fay's School in Newport, R. I., for Harvard, from which he graduated with honors in 1871.

His first contact with business was with the cotton merchandising firm of Rice & Davis, 4 Central Wharf, Boston. In 1874 he entered the boot and shoe manufacturing field and continued in it until 1889 when he was attracted to the rubber industry, joining the firm of George A. Alden & Co., crude rubber importer, in Boston. In 1893 he was taken into the firm and in the same year became a director in the firm of Adelbert H. Alden, Para, Brazil, and A. H. Alden & Co., Ltd., London, England. In 1891 he had been made secretary and director of the New York Commercial Co. He made many voyages to South America and Europe.

Much of the success of the International Rubber Conference and Exposition in New York City in 1912 is credited to Mr. Stedman. Active on leading committees, he also gave a notable address on crude rubber contracts. On the same occasion he also handled the crude rubber from Brazil, for which service he was made an honorary member of the Commercial Association of Manaos, State of Amazonas.

His activities with his confreres in the rubber trade were long, helpful, and varied. He was early affiliated with the New England Rubber Club, and in 1907-1909 was president of the Rubber Association of America, contributing much to its practical accomplishments and the sociabilities of its assemblies. Mr. Stedman had been a member of the Boston Shoe Associates since 1878 and belonged to the Royal Colonial Institute, London; St. George's Society, New York; and the Victorian Club, Boston, as well as other social organizations.

The death in January, 1913, of Mrs. Stedman (who was Mary P. Shepard), whom Mr. Stedman married in Boston in 1883, left him alone with his son, Arthur W. Stedman, Jr. He retired for some time from active business, but again engaged in rubber brokerage in 1915 with an office at 69 Beverly St., Boston. This business he sold in 1916 and became manager of the crude rubber department of the Hagemeyer Trading Co., 17 Battery Place, New York. In May, 1918, he formed the crude rubber brokerage company of Arthur W. Stedman, Inc., with offices at 68 Broad St., New York. The firm was long an active factor in the market. When Bowring & Co., shipping agent and importer on Battery Place, in 1925 opened a crude rubber department, Mr. Stedman became its manager. Of late years he had been trading in rubber on his own account, but a severe illness last summer finally forced him to curtail his activities to a minimum.

Arthur W. Stedman

The body was taken from Rosedale, L. I., where Mr. Stedman had died, to Boston, where after services and cremation on January 25 interment was made in Auburn Cemetery.

His memory, however, long will be cherished by the many who enjoyed the privilege of his friendship.

Chester Curry

CHESTER M. CURRY, well-known textile man and yachtsman, died of heart disease in the Doctors' Hospital, New York, N. Y., February 9, 1931, after four months' illness. He was 57 years old.

Mr. Curry was born in New York, a son of James S. and Amy Lane Curry. As a youth he entered the firm of Curry & Horsford, which was founded by his father. Later he became a partner in Brander & Curry, dealers in fabrics for automobile tires and bodies.

A former president of the Question Club, Mr. Curry belonged also to the Lambs and the Lotos, Wingfoot, New York and Larchmont Yacht and the New York and Detroit Athletic clubs.

Surviving him are his widow, a stepson and a brother.

Harry I. Crampton

ON JANUARY 25 after a critical illness Harry I. Crampton died at his home in Naugatuck, Conn. He had been assistant superintendent of the G. M. R. Shoe Co., Naugatuck, for about thirty years prior to his retirement several years ago. Although retired, he often was called upon to act in an advisory capacity.

Mr. Crampton was born in Waterbury, Conn., about seventy years ago. From 1886 to 1888 he worked for rubber concerns in Williamsport, R. I. In 1889 he returned to Naugatuck to join the shoe plant of the United States Rubber Co., where he soon won the post of assistant superintendent. He was a talented artist and draftsman, and a skilled designer of rubber goods.

He is survived by one son and two brothers. He belonged to the Gavel Lodge, Knights of Pythias, and Natatuc Tribe, Improved Order of Red Men.

Funeral services were conducted by the pastor of the local Congregational Church. Burial was in Grove Cemetery.

Arthur J. Wills

ARTHUR J. WILLS, 67, an employe of The B. F. Goodrich Co. for 48 years, died in Akron, O., last month. He was said to have sold the first pneumatic tire to Alexander Winton in 1896. As an employe under the presidency of Dr. B. F. Goodrich, Mr. Wills was one of the three remaining employes of the company claiming this distinction. He was a Mason, Knights Templar, and Shriner, and a member of the Portage Country, Akron City, and Cleveland Athletic clubs.

Besides his widow, he leaves two sons, a sister, and a brother.

Funeral services were held on February 23, and burial was in Akron.

William Mead

WILLIAM MEAD, supervisor of safety at the Providence plant of the United States Rubber Co., died at Indianapolis, Ind., on February 13. He had been connected with the company for thirty years, working in the engineering departments at Indianapolis and Providence where most of his time was spent. Being ill, he went to his former home in Indiana and died there.

Former Goodrich Man

FRANK P. HAMON, formerly office manager of The B. F. Goodrich Co., Akron, O., and recently director of business research for the Thomas A. Edison Co., died February 17 at E. Orange, N. J.

He was born March 17, 1879, at Auburn, N. Y. At an early age he went with his family to Cambridge, Ill., where he was educated. His other business connections were with the Rutland Railroad, Bellows Falls, Vt., and the Otis Elevator Co., Chicago, Ill.

He leaves his widow and four sons, one of whom, Gordon F. Hamon, is connected with the Goodrich company at Richmond.

Former Executive of Mason Rubber Co.

LAST month death claimed Dudley M. Mason, one of the founders of The Mason Tire & Rubber Co., Kent, O. At the time of his death, however, he was head of the Standard Safety Razor Corp., South Norwalk, Conn.

Mr. Mason was born in Middlesborough, Ky., on May 2, 1890. He attended the Des Moines, Iowa, public schools and the Des Moines Business College. Then for a while he followed a journalistic career.

He abandoned this, though, to devote himself to sales and organization work. He formed the investment security house of Mason Bros., The Mason Tire & Rubber Co., The Mason Cotton Fabric Co., later absorbed by the tire company, and the Mason Rubber Plantations. In 1915, when the Mason tire factory was erected, he became its treasurer and general manager. But ill health compelled him to resign in 1924.

D. M. Mason

Three years later he returned to the rubber industry as a director and the general manager of the Pennsylvania Rubber Co., Jeannette, Pa. After six months, however, he resigned.

Mr. Mason was married and had two sons.

Superintendent of Manhattan Rubber

A STROKE suffered February 15 caused the death of Frank B. Ball, associated with The Manhattan Rubber Mfg. Co., Passaic, N. J., since its formation in 1893, when he joined as a master mechanic, to rise to the post of superintendent in 1912. He held that position until his death.

Mr. Ball was born in Connecticut about sixty-three years ago. Soon afterward his family moved to Passaic. When he finished with school, he entered the employ of the Amadon Mills, but left it to work in the machine shop of the old New York Belting & Packing Co., before it became a part of the United States Rubber Co.

As master mechanic, Mr. Ball aided in superintending erecting the buildings and planning the machinery layout of the Manhattan company while it was being built. During his many years of service he con-

Frank Ball

tributed several labor and cost saving devices in machinery and manufacturing methods.

Extremely active in civic affairs, he was a volunteer fire engineer and later assisted in the motorization of the Passaic Fire Department. He belonged to the Elks and was a director of the American National Bank, Passaic, and the First National Bank, Whippany, as well as a vice president of the New Jersey Engineering & Supply Co.

Surviving are his wife, a niece, and three nephews.

Funeral services were held from his home on February 18. Burial was in Ridgelawn Cemetery.

Formerly with Hood

WILBUR E. BARNARD, formerly connected with the Hood Rubber Co., Watertown, Mass., died of heart failure in West Medford on February 19. He was born in Northampton sixty-five years ago and lived in West Medford for many years. His wife, Mary B. Barnard, survives him.

Joseph Brown

JOSEPH BROWN, 78, for a quarter of a century an employe of the Pierce-Roberts Rubber Co., Trenton, N. J., died recently after a lingering illness. He worked in different capacities at the rubber plant and for some years was an engineer. Surviving are five sons and four daughters. Interment was in Riverview Cemetery, Trenton.

Milnor Robbins

MILNOR ROBBINS, of 121 Norway Ave., Trenton, N. J., died on February 3 at St. Francis Hospital, Trenton, following a lengthy illness from blood poisoning. He was stricken last summer, and a few weeks ago one of his legs was amputated. Mr. Robbins was employed at the Mercer Rubber Co. for many years and for the past few years was a foreman. He leaves a widow, one son, and a daughter. Burial was in Trenton.

Founder of Converse

MARQUIS M. CONVERSE, 69, founder of the Converse Rubber Co., and an active figure in the rubber industry for more than forty years, died at the wheel of his automobile, which was parked in the downtown section of Boston, Mass., on February 9. Thus passed from the rubber industry one of its most picturesque and lovable characters, and it can be truthfully said that he died as he had lived, still carrying on.

Marquis M. Converse

Mr. Converse was essentially a self-made man. Born on a New Hampshire farm at Lyme, October 23, 1861, at the age of seventeen he bought his time from his father and went to Canada as a telegraph operator. A year later he came to Boston and entered the employ of Houghton & Dutton, a Boston department store, where in a few years he rose to the position of superintendent. Later he resigned because of ill health and went to Lebanon, N. H., where he bought a small department store.

In 1887 he returned to Boston and formed a partnership with Henry L. Pike under the firm name of Converse & Pike and secured the sales agency for Wales-Goodyear rubber footwear. The firm was very successful, but in 1899 Mr. Converse suffered a nervous breakdown and had to remain out of business three years.

In 1902 he became New England sales manager for the Beacon Falls Rubber Shoe Co., and was highly successful for the following six years, until 1908, when he organized the Converse Rubber Shoe Co. Ground was broken for the factory in 1908, and operations were started in the spring of 1909. The business prospered from the start, and sales increased from $977,000 in 1913 to $5,000,000 in 1918. The factory was enlarged in 1911, 1916, and 1920. Mr. Converse resigned from the company in 1928, and retired to his estate in Andover, Mass., where he managed his farm until his death.

The funeral services were held from his late residence at Andover on February 11, and were largely attended by his many friends and associates in the rubber industry, including the entire executive staff of the Converse Rubber Co. Interment was at Andover.

Mr. Converse is survived by his widow, two sons, Ralph H. and John K. Converse, who is wholesale sales manager for the Converse Rubber Co., two daughters and two grandchildren.

Frank D. Case

FRANK D. CASE, 52, of 108 Chewalla Drive, Trenton, N. J., for many years a tire salesman, died on February 8 from a heart attack from which he had suffered two weeks. He is survived by his widow and two brothers, E. Paul and Harry E. Case, with the Hamilton Rubber Co.

The Rubber Industry in Europe

GREAT BRITAIN

Maxwell Restriction Scheme

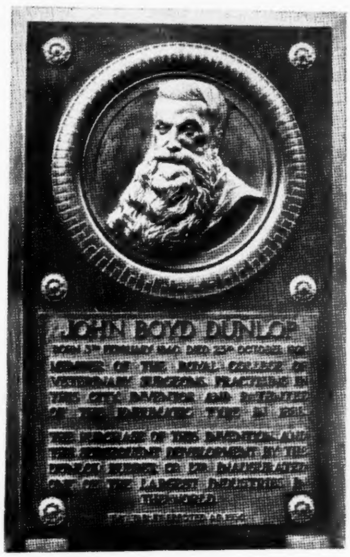
Rubber circles generally evince much interest in the latest restriction scheme, which has two important points in its favor. It is from an authoritative source, since the author, Sir George Maxwell, was chief secretary to the Federated Malay States Government from 1920 to 1926 and had much to do with the Stevenson Restriction Scheme. The scheme itself, furthermore, is very simple as the necessary machinery for its execution already exists in the British and Dutch rubber centers.

Briefly, Sir George Maxwell proposes that rubber exports from Malaya, Ceylon, European estates in the Dutch East Indies, etc., should be compulsorily restricted by 25 per cent of the actual output of 1929 as long as the London price of rubber remains below 9d. for three consecutive months. Restriction should cease automatically when that price is reached. The native producers of the Dutch East Indies, the stumbling block of every restriction scheme, are not to be included directly in this plan; instead an extra export duty of 10 per cent is suggested on all native rubber shipments whenever the price of rubber rises above 6d. and until it reaches 9d. per pound. In this way the native would not have to make any contribution until restriction put more in his pocket than the extra duty took out. This tax, it is suggested, would offset the 25 per cent restriction while at the same time it would serve to discourage the native from tapping too much as soon as the price of rubber started to improve.

Dunlop Memorial

The Dunlop Memorial tablet, recently presented to the City of Belfast by the Dunlop Rubber Co., was chiseled out of a solid block of hard rubber. No sculptured work in ebonite had ever been attempted before on such a scale, and close cooperation between the Dunlop Macinlop factory and the architectural sculptors, Earp, Hobbs & Miller of Manchester, was essential. The difficulties surrounding the production of the block will be appreciated when one realizes that it measured 4 feet long, 2½ feet wide, 6 inches thick in the deepest part, and weighed 270 pounds.

It was necessary to build up the block by running the unvulcanized compound into thin layers one upon the other; and as each ply was added, it was thoroughly rolled down with a roller to exclude all air and to secure maximum adhesion between the layers. The block was then trimmed to fit a special steel mold and given a preliminary cure lasting 54 hours, after which it was removed for examination and then returned for another 57 hours.



The Dunlop Memorial

Previous experiments by the sculptors had indicated that the ebonite was so "reasonable" that both small- and large-scale work could be easily done. Certain special difficulties of a technical nature, however, required special apparatus.

Surface Treatment of Rubber

T. R. Dawson read a paper on the "Preservation of Rubber by Surface Treatment" at the Scottish Section of the Institution of the Rubber Industry meeting in Edinburgh on January 19. The problem of preserving rubber by treating the surface has occupied the rubber industry since its beginning. Today various means are attempted, as for example, heavy oils and vaseline, which, though rendering the rubber more flexible, cause serious mechanical weakening. Castor oil appears to be one of the few oils that do not swell and destroy rubber. It has been used as a preservative dressing though it seems with doubtful advantage.

Among the variety of liquid treatments in use, the best and simplest is that of storing goods in water or keeping them slightly damp. Care should be taken, however, to change the water from time to time to prevent putrefaction and molds. An aqueous glycerine rubbed into rubber goods has an equally beneficial effect. Simple alkaline washes, as dilute aqueous solutions of ammonia or common soda, if applied at regular intervals, to rubber, also greatly lengthen its life. More complex preservatives as paints, have recently been developed, and excellent results have been obtained. These paints are particularly valuable for goods intended for use in the tropics and for articles stored for long periods.

Rubber Paving for Seashore Promenades

If the contemplated experiment at Hastings succeeds, promenades at British resorts will be considerably brightened and incidentally so will the prospects for rubber producers. Hitherto these promenades, equivalent to American boardwalks, have usually been asphalted, and the monotonous stretches broken up by shrubbery; and they have been found satisfactory for decades. But now the progressive Town Council at Hastings decides that this walk must be changed. Since the Borough Engineer at a recent meeting of the Council strongly recommended colored rubber paving because it was non-slippery, easy for the feet, hard wearing, practically noiseless, and available in such soft colors as cannot be seen in other materials, a trial section is to be paved with rubber. If this section proves satisfactory, a large portion of the promenade will be rubber paved, at a cost of about £100, while the entire portion under consideration would cost £49,240, of which about £20,000 would go for surfacing the area with rubber. The work of preparing the foundations will start next October. The experiment, quite naturally, will be watched with much interest, for if rubber paving finds favor at Hastings, no doubt other resorts will follow suit.

The Ro-Railer

Recently the London Midland & Scottish Railway Co. tried out the Ro-Railer, a vehicle constructed to travel either on the road or on the railway track. This vehicle differs very little in appearance from an ordinary truck or motor coach. The engine, which develops a maximum of 120 h.p., is fitted with a supplementary gearbox that gives increased speeds on long railway runs with lower engine speeds. The invention consists of small guide wheels, which act as flanges to the road wheels when the vehicle is required to run on rails. These are carried on arms secured to the axles, and provision is made for either of the guide wheels to be swung clear when the vehicle returns to the highway, or entirely detached in the event of the road clearance of the vehicles being limited. In cases where the dimensions of the wheel track of the car correspond to the gage of the rail on which it is desired to operate, the attachment of the carrier arms with guide wheels to the

axles is all that is necessary to convert the car for the dual purpose. In other instances some slight modification to the axles would probably be necessary to bring the track of the wheels to the required gage. It is unnecessary to lock the steering gear when the car is running on rails.

The advantages are, of course, that the vehicle can be attached to any train and is, therefore, cheaper to operate than a vehicle for road use only. The visibility, moreover, is better than with ordinary branch line trains. A speed of 75 m.p.h. can be attained on the rails.

A similar system had been devised by E. O. Noble, of the Entre Rios & Argentine North Eastern Railways, who had it applied to the standard automobiles of the company.

This is not the first time such an arrangement has been used. A motor truck equipped with tire flanges for running on railroad tracks was illustrated and described in INDIA RUBBER WORLD, June 1, 1916.

Tan Kah Kee Rubber Footwear

It is reported that Tan Kah Kee has sold a trial order of 100,000 pairs of canvas rubber-soled shoes to England at 25 cents a pair. It is understood that the original order was for 500,000 pairs, but that the buyers cut this down to a fifth. It has also been learned that Bata tried for this order, but refused to lower the price of 28 cents a pair to take it away from Tan Kah Kee. It is said that Tan Kah Kee plans to ship rubber footwear to Czechoslovakia, the home of Bata, to Australia and Africa. This activity of Tan Kah Kee will influence the foreign sales of American canvas rubber-soled shoes; consequently, American manufacturers should be prepared for this competition.

New Goods

A tread having sidewalls and ribs of normal black tread rubber and a central rib of softer red rubber recently was patented by a London concern. It seems that the wear on the soft center is at least as small as on the hard side ribs, and it is further claimed that the tread is an almost perfect anti-skid.

Steelcote is the only enamel having pure Para rubber as its basic constituent, it is claimed. This makes it resist, without cracking or peeling, expansion and contractions of metals due to changes in temperature. This base renders Steelcote so elastic that bending or folding a piece of treated metal does not mar the smooth surface. The rubber enables it to resist even a hammer blow. The enamel is economical in use; one pint is enough to refinish a small car. It dries quickly and can be applied by anyone. This product is available in twenty colors.

The Carter rigid wheel and quick-change tire for band sawing machines is built of two pressed steel disks with reenforcing ribs pressed into the metal, and the two are riveted to a solid hub. One

(*Continued on page* 98)

GERMANY

Tire Agreement

As a result of negotiations between tire manufacturers and dealers' organizations, a temporary agreement, covering only pneumatic tires for motor vehicles, was reached to remain in force until December 31, 1931. Manufacturers may sell only for resale to persons or firms on an approved list. Manufacturers, however, may sell direct to government and municipal departments, to the government railways, public transportation companies, and purchasing societies of cab owners, in which cases buyers must undertake not to resell these goods. Similarly, tire manufacturers may supply automobile manufacturers only on condition that the tires will constitute original equipment on new cars.

Claims from consumers because of defects in workmanship or material must be accompanied by special forms duly filled out.

The dealers' organizations, on their side, agree to see that the members uphold the sales conditions of the manufacturers, to carry only brands made by the contracting parties, to sell only to dealers, and where big consumers are supplied direct, to see that the latter agree not to offer such tires for resale. In addition, they may not export tires made by the contracting manufacturers, nor import them or offer them for sale when imported by others.

New Patents

The advantages of filters, diaphragms, and the like, made of webbings, braidings, or felts of threads and strips of rubber: namely, that they can be made in longer lengths and mounted with more ease than the usual filters, are sufficiently obvious as to have been suggested before. But in earlier applications the rubber was soft vulcanized. Now Franz Clouth Rheinische Gummi-Waren Fabrik A.G., Koln-Nippes, has obtained a patent for such filters, which, however, have been vulcanized hard. In the process forced rubber thread, which may have embedded in it, textile thread or fine wire, are pre-vulcanized until they hold their shape, but are still elastic and flexible. The filters are then prepared by weaving, braiding, etc. After this operation vulcanization with heat and under pressure is completed. To prevent stretching during weaving, non-elastic threads which can later be removed from the finished product may be woven with the rubber thread.

Veritas Gummi-Werke A.G. has obtained a patent for a new process of forming rubber goods. A rubber mixing containing the proper amount of accelerator is dissolved by benzine or other suitable solvent to a consistency resembling the rubber solution used for making dipped goods. The solution is then poured through an opening into a mold of tin, plaster, or other cheap material, and vulcanized at low temperature, which at first should not exceed 60-70° C. to avoid forming bubbles. After opening or breaking the mold, the properly formed article is obtained. There is no overflow and only a small piece must be removed where the opening in the mold was. Hollow articles are made by pouring the rubber about a core, which is removed through the hole after vulcanization.

Use of Gas Masks

Additional measures for protecting workers in various industries enforced in Germany two years ago, points out the *Technische Handel*, has greatly widened the market for protective articles, especially gas masks.

The importance of gas masks is illustrated by the fact that in smelting and foundry works, for instance, before the masks had reached their present state of perfection, it was frequently necessary in special cases to close down the entire works in order to make necessary repairs. Today the same can be done in a few hours by a few well-protected workers without interruption of work.

Adequate protection is necessary in smelting and foundry works, in various branches of the chemical industry, in glass and ceramics industries (as protection against dust and gases, particularly carbon-monoxide gases, lead poisons in glazing and painting the wares), in fire departments, in gas and water works, and in combating insect and animal pests, when highly poisonous gases are used. Finally, gas masks should be kept on hand in all industries such as bakeries, dairies, breweries, chocolate factories, ice plants, besides restaurants, hotels, and up-to-date apartment houses, where ammonia, sulphurous gas, or similar poisonous preparations are used for refrigerating purposes, in order to afford the necessary protection in cases of leakages.

Company Notes

Rumors that the former Peters-Union Works in Corbach had been closed by the Continental Gummiwerke A.G. have been denied. On the contrary the works are to be extended this year. The plant in Waltershausen, formerly Gummiwerke Pollak, however, will be closed the current year.

A. G. Metzeler & Co. reports that considering the general depression at home and abroad, heavy taxes, sharp competition causing undercutting of prices, the result for the past year, as far as work at the factory was concerned, was half-way satisfactory. New equipment and up-to-date methods are being introduced. The net profits for the year were 19,078.77 marks, which, with the carry-forward from the previous year, comes to 61,725 marks. Of this, 15,000 marks will be reserved and the rest carried forward. No dividend will be distributed.

Vulkan Gummiwarenfabrik Weiss & Baessler A.G. states, that despite unfavorable conditions, it found new markets for its goods. During the past year the rebuilding of the works at Grossenhain, destroyed by fire in 1929, was completed. This construction and the timely establishment of a works at Erfurt enabled the firm satisfactorily to cope with its orders. The profits for the year, including a carry-forward of 21,536 marks, came to 166,944 marks, allowing a 10 per cent dividend.

The Rubber Industry in the Far East

NETHERLANDS EAST INDIES

Kerbosch and Sprayed Rubber

The belief frequently heard in former years and still finding occasional expression today that Brazilian rubber is superior to the best grades of plantation rubber led to a number of attempts during the last twenty years to substitute for the usual crepe and sheet a product more nearly conforming to Para rubber, which it was imagined owed its superiority to the fact that it was made of whole latex.

Kerbosch rubber is one of these products. It is obtained in sheet form by evaporating the water in the latex and is, therefore, in principle similar to sprayed latex rubber, except that where the latter is obtained in flake form, the former is obtained by spraying the latex against the inside of a cylinder where the introduction of hot air causes the latex to dry in thin sheets.

Kerbosch rubber, however, has a fairly high ash content, a high moisture content, and low plasticity. It vulcanizes rapidly, but is inferior as regards "nerve." It also deteriorates rapidly when stored.

In his observations on the rapid deterioration of Kerbosch rubber, O. De Vries remarked that a sample of this rubber stored for eight years in Tjinjiroean on the Pengalan plateau, where the climate is cooler, showed considerably less deterioration than rubber of the same kind stored in Buitenzorg. This report led to a test in 1923, in which two samples of Kerbosch rubber were stored in Buitenzorg and two in Tjinjiroean. A year later a similar test was carried out with sprayed latex. The samples were examined at stated intervals until 1929, when the results confirmed the observation of Dr. de Vries that the cooler climate caused a slower rate of deterioration. This reaction was found true also of sprayed rubber.

Testing Clones Chemically

The usual method of distinguishing the individuals of clones is to judge their external morphological characteristic, which practice has the advantage that a large number of buddings can be judged in a short time. The method, however, applies only to normally grown buddings in a definite state of development. Besides a certain knack is required for this work. Dr. Bobilioff has discovered that clones may be distinguished by the different reaction of the latex to a chemical agent. This specific reaction appears to be fairly constant for a given clone. The advantage of the method is that it is independent of the age of the buddings.

According to this method a few drops of latex are withdrawn from the stalks of young or half-grown leaves and allowed to drip into depressions in a white porcelain plate; the latex from one tree is collected in one depression. A small amount of a colorless reagent is added. The mixture at this time is white, but after a few minutes it begins to change color. Experiments carried out with three different clones, ED 2, AV 256, and Tjir. 1, gave the following results. After one or two minutes the latex took on a rose color, which at first was the same for the first two clones, whereas the third soon showed a bluish shade. After a few more minutes Tjir. 1 had become quite blue, AV 256 red, and BD 2 purple. Some clones react more quickly than others; for instance, clone 209 showed only a faint coloration after 45 minutes; in others again the shades are deeper or paler. That is to say the time required for changing color, the shade taken on by the latex, and the intensity of color, all vary for different clones.

The method has been tested on a large number of clones in the experiment station gardens and on various estates in West Java, with satisfactory results. It has been suggested that the difference in color reaction of the clones may also indicate differences in the quality of the rubber, but this phase of the matter has not been investigated as yet. Dr. Bobilioff plans to apply for a patent on his discovery.

Outputs from Best Clones

In *De Bergcultures*, for December 27, 1930, appears a valuable review of the outputs of the most important Hevea clones in Java and Sumatra, together with a table showing the yields at different ages. The oldest clones are the Bodjong Datar, the Pasir Waringin, and the Cultuurtuin clones, all of which were planted in 1918; and figures of yields for the twelfth year are therefore available for them. Some of these older trees yielded as much as 11.8, 9.2, and 10.4 kilos of dry rubber a tree a year in their twelfth year.

It may be observed in general that the figures indicate that the exclusive use of individual clones is still risky, and the experiment stations therefore continue to advise that the risk be divided by using 8 to 10 clones. As was mentioned in previous communications from the Rubber Experiment Station, it has happened that approved clones later on showed a tendency to give lower yields as they grew older, or a special sensitiveness to brown bast manifested itself after a time. Thus clone AV 33 grows rather slowly and shows comparatively poor bark renewal. AV 36 and 163 show too many cases where trees are blown over by the wind. AV 35 and 80 disappointed as to yields; while the latter is susceptible to pink disease. Again BD 2 is a good yielder, but the quality of the rubber is not so good as might be, while in addition it is suspected that it may have a tendency to brown bast. High expectations were cherished with regard to Ct. 88, one of the oldest clones, but after a time, the yield proved disappointing.

Up to the present, AV 49, 50, and 152, BD 5 and 10, Tjir. 1, and XVI, and War. 1 continue to fulfill their early promise. In addition a number of newer clones, however, have not been observed sufficiently long to be used on an extensive scale. Planters are advised to consult their experiment stations before making up programs for planting buddings, and to give as many details regarding conditions as possible.

Use of Improved Material

In an article on the Ashplant theory regarding latex tube bore, Dr. Cramer, who may be said to be the father of the idea of budding Hevea, gives a unique table regarding the extensions with selected material that have been made from 1924 to 1929, inclusive, in Sumatra. In 1924 extensions totaled 22,252 acres, of which 2,580 acres or 11.6 per cent consisted of buddings, 5,975 acres or 26.9 per cent of mixed buddings and seedlings, 4,215 acres or 18.9 per cent of selected seedlings, while in all, 57.4 per cent of the area was planted with improved material, 38.5 per cent consisting of buddings and buddings and seedlings mixed.

The following year out of a total extension of 20,630 acres only 6.5 per cent was under buddings exclusively, but the area under mixed buddings and seedlings had increased to 55 per cent of the total area newly planted. Apparently confidence in buddings was soon reestablished, for in 1926, 25.3 per cent of a total area of 34,182 acres were planted with buddings exclusively, 48.1 per cent with mixed buddings and seedlings, and 20.7 per cent with selected seedlings, so that 94.1 per cent of the area was planted with improved material.

Approximately the same proportions were planted in this way in 1927, when the new plantings covered an area of 40,507 acres, practically all of which was planted with improved materials. In 1928 and 1929, 100 per cent of the areas newly planted, 44,257 acres and 32,960 acres, respectively, were planted with selected material; the proportions under mixed buddings and seedlings were 85.2 and 96 per cent respectively.

The enormous headway that buddings have made in the favor of planters in Sumatra can be judged from the fact that in 1929, 58.7 per cent of the new plantings were made with buddings only, 37.4 per cent with mixed buddings and selected seedlings, and only 4 per cent with selected seedlings.

(*Continued on page* 98)

MALAYA

Malaya Rubber Statistics, 1930

Details of the shipments of rubber from Malaya during December, 1930, and for the whole year 1930 have just been issued by the Registrar-General of Statistics, Straits Settlements and Federated Malay States. To compare the trend of net Malayan exports and foreign imports, the following figures are given:

	Tons		
1930	Gross Exports	Domestic Exports	Foreign Imports
Jan.	52,535	42,265	11,773
Feb.	48,947	38,874	12,960
Mar.	47,320	36,657	13,236
Apr.	43,803	32,498	14,627
May	49,016	37,785	13,253
June	36,607	26,381	12,126
July	41,347	31,278	12,759
Aug.	47,800	38,406	10,304
Sept.	48,529	40,972	8,087
Oct.	47,770	41,396	7,312
Nov.	40,958	34,702	7,774
Dec.	41,889	34,659	9,671

Total exports were 546,521 tons during the year; the domestic exports, 435,873 tons; and foreign imports, including wet rubber, 133,876 tons. Domestic exports show a distinct downward tendency from the beginning of the year for the first four months. May reveals a sudden spurt in these shipments again. The June and July figures reflect the May tapping holiday, but for the next three months tapping was evidently as brisk as ever. The decline in November and December undoubtedly suggests the efforts of those companies that decided to adopt the rational course and resort to selective tapping.

January, 1931, figures just issued, give the gross exports as 41,579 long tons, of which 101 tons were liquid latex, Revertex, etc. The imports were 11,029 long tons, including 8,158 tons of wet rubber. The policy of the estates to curtail outputs, therefore, has so far been maintained.

Up to and including July, the monthly native shipments to Malaya were near normal. The decline definitely began in August, until in October the amount was only 7,312 tons, the smallest in some years. After this period, however, an upward swing started again; consequently the shipments in January, 1931, are actually not far below those for January, 1930, that is 11,029 against 11,773 tons.

The renewed increase in native shipments is more than a disappointment; it is a distinct cause for anxiety. It brings up the question as to whether those reports about the natives cutting out rubber trees in order to plant rice, have not been exaggerated. It raises again the question as to how low rubber must fall before the native becomes sufficiently discouraged to give up rubber.

Finally it suggests the possibility that the natives find rubber a crop so much to their liking, requiring so little labor, that provided they can exchange it for enough food to keep them from starving, they will not give it up, and be content with the minimum for the present, meantime hoping that the golden days of the boom of 1925 will soon return.

It is worth remembering that these native rubber outputs do not depend only on the native attitude on the subject; the remiller also must be considered. If the remiller cannot get rid of his product fast enough, if he cannot make enough on it to pay his way and is losing so much ground that he is forced to close down, then the native owner must stop tapping too. It is thought that the increased native rubber shipment during the last few months is due to the reaction of the native producer to the rise in prices during that time. But it may just as well be that Chinese remillers, watching the rise, bestirred themselves to get increased supplies, in anticipation of a continued rise. We cannot, therefore, be sure that even 4d. a pound, when the gain to the native must be absurdly small, is too low a price for him to continue to produce as much rubber as he can sell.

Remilling Factories

That this condition is so seems to be borne out by some recently published data concerning remillers in Singapore. According to these reports it seems that until a little more than a year ago 29 firms owning 35 factories equipped with 827 machines, engaged in this business in Singapore. Of these, five were forced to close in 1929, when the average price for rubber was about twice what it is today; two closed late in 1930; three failed in October, 1930; and one burned last November.

It seems that the machines now installed are capable of handling more than twice the amount of rubber ever remilled in Singapore. In addition to these larger factories a number of smaller works, estimated between 30 and 40, are in the interior of Malaya. They average 5 to 10 machines each. The business is therefore extremely overcrowded. Competition, consequently, must be very keen even under normal circumstances.

Estate News

Merlimau Pegoh has bought the properties of the Permatong Rubber Estates, in Johore, for £60,000 payable £45,000 in 7 per cent convertible first mortgage debenture stock and £15,000 in ordinary shares of 2s. each at par. The new properties consist of Permatang, with an area of 2,088 acres of which 828 are mature, and Empang, having an area of 1,222 acres of which 444 are mature, a total of 3,310 acres of which 1,272 are mature.

Until recently the coolies who did the tapping refused to do other work, and weeding, cultivation, etc., had to be done by other coolies.

However, as the chairman of the Chimpul Rubber Estates put it in his annual report, "Under stress of present conditions, many estates have had no difficulty in persuading their tappers, whose work is finished in the morning, to weed their own tasks. . . The various Planters' Associations in Malaya are endeavoring to bring this system into universal use, and it is hoped that it will become a permanent feature of estate routine."

If it does, the slump will have had at least this effect, that it has shown one ready means of permanently reducing costs.

The Perak River Valley Rubber Co., Ltd., has contracted for the sale of 4 tons of No. 1 smoked sheets monthly, at 16⅜ cents (Straits currency) per pound for one year from January to December, 1931. This contract represents about one-third of the crop it is expected to harvest.

The Kundong Rubber Estate reports short term contracts as follows: January, 10 tons at 13⅞ cents (Straits currency), February, 3½ tons at 16⅛ cents, and March 3½ tons at 16⅛ cents.

Areas and Outputs of Crude Rubber

At a recent meeting of the Midland section of the Institution of the Rubber Industry at Birmingham, George Rae, head of the statistical department of Harrison & Crosfield, discussed areas and outputs of crude rubber. At the end of 1929 the area of plantation rubber was between 6,600,000 and 7,200,000 acres; the area under native cultivation in the N. E. I. was estimated at between 1,100,000 and 1,700,000 acres. Of the remaining 5,500,000 acres, about 3,360,000 consist of European and American-owned estates; 510,000 are Asiatic-owned estates of over 100 acres; and 1,630,000 acres are native holdings under 100 acres.

About 80 per cent of the trees on estates, 90 per cent of the native rubber in Malaya and Ceylon, and probably less than 50 per cent of the native rubber elsewhere are tappable.

The actual output of rubber for 1929, according to the nationality, follows:

	Tons	Percentage
British: United Kingdom	236,000	27.9
British: Local	69,000	8.1
Dutch	57,000	6.7
Other European	30,000	3.5
American	22,000	2.6
Asiatic Estate	64,000	7.6
Malayan Native	199,000	23.4
Netherlands East Indies, Native	108,000	12.8
Other Native	36,000	4.3
Wild	26,000	3.1
Total	847,000	100.0

An examination of these figures reveals some interesting facts. In the first place, with even the lower estimate for Dutch native rubber, namely 1,100,000 acres, the acreage owned by Asiatics totals 3,240,000 acres, or not much below the total European and American acreage. While if the higher figure for the Dutch native area is taken, 1,700,000 acres, the Asiatic total is 3,840,000 acres, or well over the European total.

While 36 per cent of the world's output of rubber came from British owned estates, only 6.7 per cent was supplied by Dutch owned estates, and 48.1 per cent of the rubber was obtained from Asiatic areas against 48.8 per cent from European and American estates. The fact that owners of holdings of less than 100 acres in Malaya supplied nearly twice as much rubber as the natives in the N. E. I., gives food for thought. The figures throw a peculiar light on British bitterness over the Dutch attitude toward restriction, now and in the past.

Patents, Trade Marks, and Designs

Machinery

United States

1,786,437.* **Inner Tube Duster.** This device provides for automatically dusting inner tubes with soapstone to prevent their adhering together should they come in contact when they are placed in the vulcanizer. P. W. Lehman, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,786,499.* **Press for Tread Splices.** This apparatus is designed to exert a pressure at the tread splice of a flat built tire that will insure a tight unyielding splice. C. E. Maynard, Northampton, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,786,542.* **Cutter.** This is a machine whereby articles of different contours and width may be automatically and rapidly cut from a sheet of material. F. J. MacDonald, Newton, Mass., assignor by mesne assignments to Hood Rubber Co., Inc., Wilmington, Del.

1,787,168.* **Tire Flap Machine.** A continuous strip material assembling machine produces tire flaps from rubberized and plain fabric to form a composite continuous band. It provides means for applying a uniform tension to the band as it is reeled upon the vulcanizing form. E. D. Putt, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,787,826.* **Wind-up Apparatus.** This device is applicable to machines for cutting and winding web materials of tacky rubber used in manufacturing pneumatic tires and inner tubes. The wind-up is automatic in action and provides favorable stock handling conditions. P. W. Lehman, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,787,891.* **Heating Apparatus.** This is an apparatus for agitating and heating a fluid mass within a retort and has particular reference to the treatment of rubber or rubber goods, as in devulcanizing or reclaiming, dissolving, and similar processes. B. R. Barder, assignor to Biggs Boiler Works Co., both of Akron, O.

1,788,238. **Shoe Pressing Apparatus.** By this device the rubberized sole margin of a lasted upper or shoe lining can be compressed and adhered to an insole mounted on the last. It may also be used for pressing soles onto insoles, etc. M. C. Hoskin, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,788,615.* **Thread Cutter.** This machine is designed to cut a rubber thread of predetermined width and thickness from a substantially solid cylindrical roll of rubber stock. F. W. Bommer, Everett, Mass.

1,788,749.* **Tube Coiling Machine.** An automatic apparatus coils flexible hose as it is manufactured, treated, or finished. The feeding or laying mechanism automatically reverses when the periphery or center of the coil is reached, thus causing the formation of uniform superimposed coiled layers. S. S. Sharer, H. W. Kugler, and F. V. Smith, all of Pittsburgh, Pa., and G. L. Hurst, assignors to Pioneer Rubber Mills, both of San Francisco, Calif.

1,789,143.* **Tire Band Machine.** This device has an inflatable band building drum with flexible sides and disk heads. On inflating the drum the heads are pushed apart. The tire band is built, its plies rolled down, and it bead edges trimmed against bead seats on the peripheries of the drum heads. When the drum is deflated, the heads are drawn together; the flexible sides retract sufficiently to allow the tire band to be removed. H. T. Kraft, Akron, O.

1,786,290. **Hollow Article Vulcanizer.** H. A. Denmire, assignor to General Tire & Rubber Co., both of Akron, O.

1,786,291. **Tire Vulcanizing Mold.** H. A. Denmire, assignor to General Tire & Rubber Co., both of Akron, O.

1,786,440. **Tube Splicing Press.** C. E. Maynard, Northampton, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,786,483. **Composition Float Valve Mold.** E. L. Delany, Brooklyn, N. Y.

1,787,177. **Footwear Mold.** H., A., and G. Steppé, all of Berchem-Ste. Agathe, Belgium.

1,787,411. **Tire Bead Reenforcer.** H. D. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,787,412. **Grinder or Buffer.** H. D. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,787,413. **Tire Builder.** W. C. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,787,414. **Strip Applier.** W. C. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,787,423. **Band Stretching Machine.** W. E. Humphrey, Kent, assignor, by mesne assignments, to Akron Standard Mold Co., Akron, both in O.

1,787,507. **Mixer.** D. R. Bowen, Ansonia, and C. F. Schnuck, New Haven, assignors, by mesne assignments, to Farrel-Birmingham Co., Inc., Ansonia, all in Conn.

1,787,761. **Engraving Machine Pattern Cam.** E. Pomplum and W. Jennerjahn, both of Cudahy, Wis., assignors to Fisk Rubber Co., Chicopee Falls, Mass.

1,788,428. **Torus Shaped Device.** E. Garabiol, La Tronche, assignor to Societe des Procedes "Fit," Grenoble, both in France.

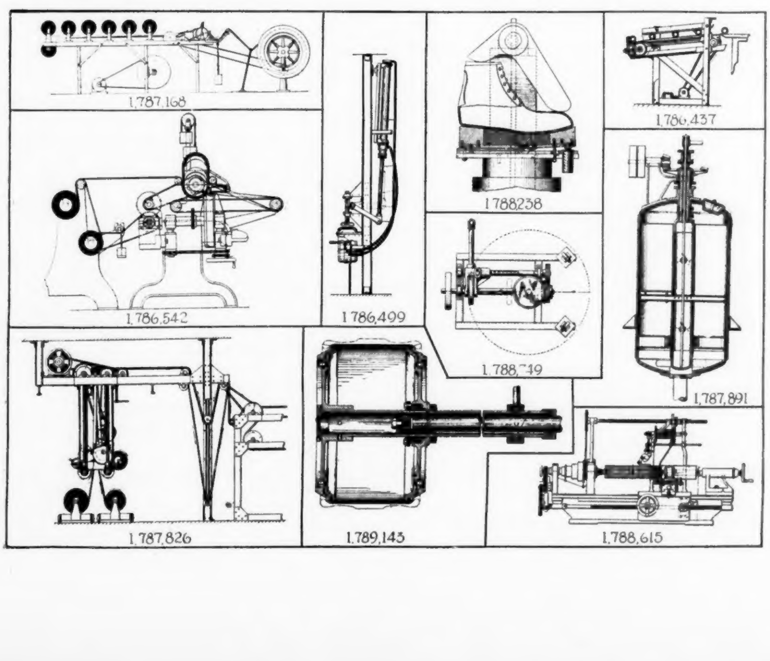
1,788,527. **Sheathed Article Producer.** R. C. Kivley, Oak Park, Ill., assignor to Western Electric Co., Inc., New York, N. Y.

1,788,564. **Rewinder.** T. L. Daniel, Atlanta, Ga., assignor to Goodyear Tire & Rubber Co., Akron, O.

1,788,568. **Repair Vulcanizer.** H. Erikson, Lowell, Mass., assignor to Norko Mfg. Co., Pawtucket, R. I.

1,788,981. **Nipple Perforator.** P. H. Carpenter, Kent, O.

* Pictured in group illustration.



Dominion of Canada

307,196. **Repair Vulcanizer.** Norko Mfg Co., Pawtucket, R. I., assignee of H. Erikson, Lowell, Mass., both in the U. S. A.

307,411. **Tire Machine.** De Laski & Thropp Circular Woven Tire Co., assignee of C. M. Thropp, executrix of the estate of P. D. Thropp, deceased, and L. A. Moreland, all of Trenton, N. J., U. S. A.

307,426. **Tube Puncher and Valve Inserter.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of G. B. Nichols, Akron, O., U. S. A.

307,487. **Mold Press.** Joseph Stokes Rubber Co., Ltd., assignee of P. O. Gunkel, both of Welland, Ont.

307,703. **Drum.** Goodyear Tire & Rubber Co., assignee of J. D. Berwick, both of Akron, O., U. S. A.

307,705. **Tire Lining Apparatus.** Goodyear Tire & Rubber Co., Akron, assignee of H. M. Brown, Cuyahoga Falls, both in O., U. S. A.

307,909. **Coating Apparatus.** B. F. Goodrich Co., New York, N. Y., assignee of A. B. Mullin, Akron, O., both in the U. S. A.

United Kingdom

337,055. **Tire Mold.** H. Barcan, Ilford, Essex.

337,234. **Tube Valve Inserter.** Firestone Tire & Rubber Co., Ltd., Brentford, Middlesex. (Firestone Tire & Rubber Co., Akron, O., U. S. A.)

337,435. **Stock Remover.** Goodyear Tire & Rubber Co., assignee of W. E. MacMonagle, both of Akron, O., U. S. A.

337,627. **Dress Shield Mold.** R. Langer, Vienna, Austria.

337,764. **Sole Laying Machine.** British United Shoe Machinery Co., Ltd., Leicester. (United Shoe Machinery Corp., Boston, Mass., U. S. A.)

337,831. **Golosh Molding Device.** H. C. L. Dunker, Helsingborg, in Sweden.

Germany

516,450. **Vulcanizing Rubber Ends.** Hydraulik G.m.b.H., Duisburg.

516,641. **Shoe and Sole Mold.** H. McGhee, Rushcutters Bay, Australia. Represented by W. Karsten and C. Wiegand, both of Berlin S.W. 11.

516,872. **Pressing Rings on Container Covers.** Frères Ewers & Cie (Inh. A.G. für Cartonnagenindustrie), Lübeck.

Designs

1,149,948. **Dipping Apparatus.** H. Schirm, Leipzig W. 33.

1,151,245. **Rubber Cutting Device.** Chas. Macintosh & Co., Ltd., Manchester, England. Represented by R. and M. M. Wirth, C. Weihe, and H. Weil, all of Frankfurt a. Main, and T. R. Koehnhorn and E. Noll, both of Berlin S.W. 11.

1,154,127. **Removing Ribs from Cycle Tires.** Continental Gummi-Werke A.G., Hannover.

Austria

119,758. **Automatic Tire Pump.** R. Culk and R. Josef, Eggenberg bei Graz.

Process

United States

1,786,907. **Footwear Repairing.** C. H. Geppert, Des Moines, Iowa.

1,786,983 and 1,786,984. **Footwear Manufacture.** E. J. Dempsey and E. H. Costellow, assignors to Phillips-Baker Rubber Co., all of Providence, R. I.

1,788,084. **Pile Fabric Manufacture.** M. G. Curtis, Cynwyd, Pa.

1,788,989. **Pile Fabric Manufacture.** A. W. Drobile, Cynwyd, Pa.

Dominion of Canada

307,114. **Brake Lining.** E. Slade, New York, N. Y., U. S. A.

307,158. **Ornamenting Rubber Articles.** Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of E. A. Murphy and A. Niven, both of Birmingham, all in England.

307,643. **Electrodeposition of Rubber.** Anode Rubber Co., Ltd., London, E. C. 2, England, assignee of P. Klein and A. Szegvari, both of Budapest, Hungary.

307,644. **Electrodeposition of Rubber.** Anode Rubber Co., Ltd., London, E. C. 2, England, assignee of Eastman Kodak Co., assignee of C. L. Beal and L. W. Eberlin, all of Rochester, N. Y., U. S. A.

307,645. **Electrodeposition of Rubber.** Anode Rubber Co., Ltd., London, E. C. 2, England, assignee of Eastman Kodak Co., assignee of S. E. Sheppard and L. W. Eberlin, all of Rochester, N. Y., U. S. A.

307,646, 307,647 and 307,648. **Electrodeposition of Rubber.** Anode Rubber Co., Ltd., London, E. C. 2, England, assignee of P. Klein, Budapest VII, Hungary, and A. Szegvari, Akron, O., U. S. A.

307,649. **Electrodeposition of Rubber.** Anode Rubber Co., Ltd., Guernsey, Channel Islands, assignee of P. Klein, Budapest VII, Hungary; A. Szegvari, Akron, O., U. S. A., and R. F. McKay, C. Hayes, and G. W. Trobridge, all of Erdington, Birmingham, England.

307,674. **Wheel.** Canadian I. T. S. Rubber Co., W. Toronto, assignee of O. B. Crowell, Toronto, both in Ontario.

307,702. **Coating for Metal and Sealing Material.** Goodyear Tire & Rubber Co., assignee of R. P. Dinsmore, both of Akron, O., U. S. A.

307,704. **Treating Balloon Fabric.** Goodyear Tire & Rubber Co., assignee of C. M. Carson, both of Akron, O., U. S. A.

307,863. **Filtering.** Anode Rubber Co. (England), Ltd., London, England, assignee of A. Szegvari and C. M. Spencer, both of Akron, O., U. S. A.

United Kingdom

337,176. **Driving Belt.** Dunlop Rubber Co., Ltd., London, and S. Sadler, Fort Dunlop, Birmingham.

337,222. **Rubber Coatings.** H. Beckmann, Berlin, Germany.

Germany

515,340. **Porous Rubber.** R. J. Noar, Pendleton, Lancaster, England.

515,514. **Pneumatic Tires.** B. F. Goodrich Co., New York, N. Y., U. S. A. Represented by G. Benjamin, Berlin-Charlottenburg.

516,199. **Heating Vulcanizing Presses.** O. Bohres, Gelsenkirchen.

516,203. **Determining Plasticity and Adhesion.** Hydraulik G.m.b.H., and W. F. Koerver, Duisburg.

Austria

118,984. **Belting Disks.** J. C. Martins, Copenhagen, Denmark.

119,438. **Felloes.** Dunlop Rubber Co., Ltd., London, England.

Holland

44,678. **Sprayed Latex Sheets.** A. van der Schuyt, Jr.

45,159. **Sprayed Latex Sole Crepe.** A. van der Schuyt, Jr.

Chemical

United States

1,786,075. **Treating Rubber.** C. Martell, Cicero, Ill., assignor to Western Electric Co., Inc., New York, N. Y.

1,786,149. **Reclaimed Rubber.** C. H. Campbell, Pittsburgh, Pa., assignor, by mesne assignments, to Peter Cooper Corps., Wilmington, Del.

1,786,281. **Composition.** F. C. Zobel, Brooklyn, N. Y.

1,786,563. **Composition.** H. L. Fisher, Leonia, N. J., assignor to B. F. Goodrich Co., New York, N. Y.

1,786,831. **Tasteless Rubber.** C. E. Dellenbarger, Chicago, assignor to P. Carpenter, Glenview, both in Ill.

1,787,064 and 1,787,065. **Age-Resister.** W. S. Calcott and W. A. Douglass, both of Penns Grove, N. J., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.

1,787,145. **Vulcanizing Rubber to Leather.** L. B. Conant, Cambridge, Mass., assignors, by mesne assignments, to Standard Patent Process Corp., a corporation of Mass.

1,787,258. **Accelerator.** C. O. North, Nitro, W. Va., assignors to Rubber Service Laboratories Co., Akron, O.

1,787,338 and 1,787,339. **Dispersion Process.** A. L. Clapp, Danvers, assignor to Bennett, Inc., Boston, both in Mass.

1,787,680. **Composition.** R. C. Hartong, Akron, assignor to Seiberling Rubber Co., Barberton, both in O.

1,787,952. **Rubber-Fiber Impregnation.** G. A. Richter and R. B. Hill, assignors to Brown Co., all of Berlin, N. H.

1,788,585. **Accelerator.** A. H. Ney, Passaic, N. J., assignor to Goodyear Tire & Rubber Co., Akron, O.

1,788,773. **Accelerator.** H. W. Matheson, assignor to Canadian Electric Products Co., Ltd., both of Montreal, P. Q., Canada.

1,788,860. **Antioxidant.** A. M. Clifford, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,788,903. **Age-Resister.** W. D. Wolfe, Cuyahoga Falls, assignor to Goodyear Tire & Rubber Co., Akron, both in O.

1,789,062. **Treating Latex.** E. E. Ayres, Jr., Swarthmore, assignor to B. A. S. Co., Philadelphia, both in Pa.

Dominion of Canada

307,398. **Non-Caking Pigment.** Canadian Industries, Ltd., Montreal, P. Q., assignee of C. Coolidge and H. S. Holt, both of Wilmington, Del., U. S. A.

307,414. **Dispersions Treatment.** Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of C. Hayes, Sutton Coldfield, and E. W. Madge and F. H. Lane, both of Birmingham, all in England.

307,423. **Rubber-like Mass.** I. G. Farbenindustrie A.G., Frankfort a.M., assignee of K. Meisenburg, Leverkusen Rhine, and P. Stöcklin, Koln-Mülheim, all in Germany.

307,519. **Waterproof Composition.** Dunlop Rubber Co., Ltd., London, N. W. 1, England, and Anode Rubber Co., Ltd., St. Peter's Port, Guernsey, Channel Islands, assignees of D. F. Twiss and W. G. Gorham, both of Birmingham, England.

307,701. **Accelerator.** Goodyear Tire & Rubber Co., assignee of J. Teppema, both of Akron, O., U. S. A.

307,903. **Rubber-like Mass.** I. G. Farbenindustrie A.G., Frankfört a.M., assignee of A. Koch, Koln-Deutz, both in Germany.

307,906. **Artificial Hard Rubber.** I. G. Farbenindustrie A.G., Frankfort a.M., assignee of W. Zieser, Leverkusen Rhine, both in Germany.

307,965. **Composition.** Thermatomic Carbon Co., assignee of E. B. Spear, both of Pittsburgh, and R. L. Moore, Mt. Lebanon, all in Pa., U. S. A.

United Kingdom

336,659. **Rubber Electro - Deposition.** Dunlop Rubber Co., Ltd., London, D. F. Twiss, A. A. Round, and E. W. Madge, all of Fort Dunlop, Birmingham.

337,019. **Synthetic Rubber.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfort a.M., Germany.)

337,095. **Composition.** J. Y. Johnson, London. (I. G. Farbenindustrie A.G., Frankfort a.M., Germany.)

337,269. **Creaming Latex.** K. D. P., Ltd., London.

337,359. **Fibrous Product.** F. T. Lahey, Brooklyn, N. Y., U. S. A.

337,460. **Synthetic Rubber.** A. Carpmael, London. (I. G. Farbenindustrie A.G., Frankfort a.M., Germany.)

337,521. **Bituminous Composition.** J. Y. Johnson, London. (I. G. Farbenindustrie, A.G., Frankfort a.M., Germany.)

337,806. **Rubber-like Product.** J. Y. Johnson, London. (I. G. Farbenindustrie A.G., Frankfort a.M., Germany.)

337,946. **Treating Latex.** Imperial Chemical Industries, Ltd., London, and R. B. F. F. Clarke, Manchester.

338,065. **Waterproof Fabric.** British Celanese, Ltd., London.

Germany

515,143. **Artificial Rubber.** I. G. Farbenindustrie A.G., Frankfurt a.M.

515,603. **Rubber Hydro-carbon from Latex.** K. D. P., Ltd., London, England. Represented by F. Cochlovius, Frankfurt a.M.

517,097. **Solvent.** Deutsche Hydrierwerke A.G., Berlin-Charlottenburg.

517,208. **Improving Aging Qualities.** Societa Italiana Pirelli, Milan, Italy. Represented by W. Ziegler, Berlin-Charlottenburg.

517,450. **Coloring Rubber.** I. G. Farbenindustrie A.G., Frankfurt a.M.

517,490. **Preparing Gels from Latex.** I. G. Farbenindustrie A.G., Frankfurt a.M.

Holland

37,038. **Stabilizing Latex.** Rubber Latex Research Corp.

39,649. **Artificial Rubber.** I. G. Farbenindustrie A.G.

40,154. **Aqueous Dispersions.** Anode Rubber Co.

43,963. **Cement from Latex.** Nederlandsche Gutta Percha Mij.

45,352. **Rubber-like Products.** I. G. Farbenindustrie A.G.

General

United States

1,785,732. **Fountain Brush.** J. Flockhart, assignor to Flockhart Co., both of San Francisco, Calif.

1,785,755. **Automobile Step Tread.** G. E. Whitlock, assignor to City Auto Stamping Co., both of Toledo, O.

1,785,859. **Dilution Bottle Stopper.** E. Escher, Jr., Brooklyn, N. Y.

1,785,908. **Closed Car Panel Roof.** E. B. Malcolm, Montreal, P. Q., Canada.

1,786,101. **Tire and Wheel.** C. K. Welch, Coventry, England; A. G. and R. Welch administrators of said C. K. Welch, deceased.

1,786,103. **Tire Inflater.** A. M. Baird and F. J. Partridge, both of Topeka, Kan.; M. L. Baird, administratrix of said A. M. Baird, deceased, assignor to Baird Pneumatic Register Co., Topeka, Kan.

1,786,327. **Hat Sweatband.** F. M. Bartlett, Reading, and B. F. Hartwell, Winchester, both in Mass.

1,780,539. **Endless Track Belt.** A. Kégresse, Courbevoie, France.

1,786,568. **Bait.** W. G. Kutz, Toledo, O.

1,786,717. **Trolley Silencer.** E. D. Moore and F. R. Dippman, assignors to Ohio Brass Co., all of Mansfield, O.

1,786,718, 1,786,719 and 1,786,720. **Current Collector Support.** E. D. Moore and F. R. Dippman, assignors to Ohio Brass Co., all of Mansfield, O.

1,786,761. **Casing Shoe and Valve.** J. Q. Little, Whittier, Calif.

1,786,803. **Road Scraper.** E. A. Weeks, assignor to Root Spring Scraper Co., both of Kalamazoo, Mich.

1,786,937. **Electric Conductor Mounting.** W. R. Edson, New York, N. Y., assignor, by mesne assignments, to Rubber Shock Insulator Corp., Wilmington, Del.

1,787,071. **Resilient Wheel.** S. C. Hatfield, Baltimore, Md.

1,787,153. **Inflation Device.** W. E. Huffman, Dayton, O.

1,787,159. **Balloon Spinner.** B. C. Merritt, Shrewsbury, Mass.

1,787,270. **Motion Picture Projector Stand.** A. C. Hayden, Brockton, Mass.

1,787,364. **Mounting Articles in Boxes.** P. E. Fenton, Thomaston, assignor to Scoville Mfg. Co., Waterbury, both in Conn.

1,787,539. **Vehicle Cushion Connection.** A. H. Leipert, assignor to International Motor Co., both of New York, N. Y.

1,787,857. **Gear.** E. A. Doub, assignor of one half to J. R. Wilkins, both of Walnut, Kan.

1,787,976. **Pontoon.** I. M. Evensen, Toronto, Ont., Canada.

1,788,042. **Punctureproof Tire.** S. Bardaxoglou, Brooklyn, N. Y.

1,788,059. **Pneumatic Tire.** A. Kahlow, Mayville, and W. H. Markham, Horicon, both in Wis.

1,788,212. **Fountain Pen.** S. Summer, Albany, assignor of one half to F. S. Summer, New York, both in N. Y.

1,788,277. **Flashlight.** W. Cornell, Minneapolis, Minn.

1,788,334. **Tire Valve.** L. Schneider and A. Reich, both of Brooklyn, N. Y.

1,788,335. **Tire Sectional Tube.** L. Schneider and R. Reich, both of Brooklyn, N. Y.

1,788,389. **Box Toe Stiffener.** R. E. Garrett, Lancaster, assignor to Armstrong Cork Co., Pittsburgh, both in Pa.

1,788,394. **Aircraft Covering.** I. M. Jacobsohn, Chicago, Ill., and S. Truscott, Birmingham, O.

1,788,439. **Tire Fabric.** W. H. Paull and R. Truesdale, both of Fort Dunlop, Birmingham, England, assignors to Dunlop Tire & Rubber Corp. of America, Buffalo, N. Y.

1,788,503. **Water Freezing Apparatus.** M. T. Zeigler, Huntington Park, Calif.

1,788,636. **Capo Tasto.** W. H. Russell, Los Angeles, Calif.

1,788,658. **Eraser.** C. C. Carlson, Rawlins, Wyo.

1,788,665. **Type Holder.** W. L. Edgarton, Berwyn, Ill.

1,788,699. **Tire Inflation.** M. G. Zinsitz, Brookfield, Wis.

1,788,878. **Engine Mounting.** R. K. Lee, Detroit, assignor to Chrysler Corp., Highland Park, both in Mich.

1,789,048. **Dust Collector.** F. Moinett, Canton, O.

1,789,180. **Elastic Stitching.** W. C. Kemp, Norwood, assignor to Paper Service Co., Lockland, both in O.

Dominion of Canada

306,328. **Hollow Article Core.** Goodyear Tire & Rubber Co., assignee of R. S. Burdette, both of Akron, O., U. S. A.

306,514. **Hot Water Bag.** H. Ziele, Napier, New Zealand.

306,597. **Tire Valve Cap.** A. Schrader's Son, Inc., assignee of J. Wahl, both of New York, N. Y., U. S. A.

306,650. **Fountain Pen.** D. M. J. Conway, Jasper, Alta.

306,657. **Cord Reenforced Tube.** E. Fetter, Baltimore, Md., U. S. A.

306,672. **Flexible Hand Stamp.** F. L. Lake, Dallas, Tex., U. S. A.

306,719 and 306,720. **Tire Inflator.** Air-Scale Co., Toledo, assignee of E. M. Morley, Delta, both in O., U. S. A.

306,863. **Watertight Electric Fuse.** W. Eschbach, Troisdorf, near Cologne a. Rh., Germany.

307,155. **Cement Gun Nozzle.** Cement Gun Construction Co., Chicago, Ill., assignee of E. C. Swann, New York, N. Y., both in the U. S. A.

307,285. **Pneumatic Device Stem.** J. C. Crowley, Cleveland Heights, O., U. S. A.

307,286 and 307,287. **Valve Stem and Adapter.** J. C. Crowley, Cleveland Heights, O., U. S. A.

307,327. **Arch Corrector.** I. J. Marcelle, Buffalo, N. Y., U. S. A.

306,330. **Flush Tank Valve.** G. B. Mullen, Bayside, N. Y., U. S. A.

307,412 and 307,413. **Valve Inside.** Dill Mfg. Co., Cleveland, assignee of J. C. Crowley, Cleveland Heights, both in O., U. S. A.

307,574. **Container and Applicator.** C. J. S. Herzog, New York, N. Y., U. S. A.

307,609. **Dermatological Instrument.** C. A. Price, Toronto, Ont.

307,625. **Tire Signaling Device.** C. Van Ess, Dorchester, Wis., U. S. A.

307,686. **Artificial Limb.** Desoutter Bros., Ltd., assignee of C. Desoutter, both of London, W. 1, England.

307,784. **Wheel and Tire.** F. F. Andersen, Oslo, Norway.

307,810. **Twin Body Tire Valve.** H. Hasting, Detroit, Mich., U. S. A.

307,844. **Railroad Vehicle.** A. Spencer, London, S. W. 1, England.

307,850. **Traffic Marker.** A. L. Voight, Lakewood, O., U. S. A.

307,896. **Valve.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. Z. Cobb, Providence, R. I., U. S. A.

United Kingdom

336,502. **Ladder Nonslipping Shoe.** W. Thomson, Bolton.

336,504. **Boot.** F. Stadler, Rosswein, Saxony, Germany.

336,508. **Catamenial Appliance.** N. Takeuchi, Takinogawa-cho, Tokio, Japan.

336,518. **Tire Pressure Gage.** A. Schrader's Son, Inc., Brooklyn, assignee of J. Wahl, Rosedale, both in N. Y., U. S. A.

336,553. **Pile Fabric.** A. J. Stephens, London. (Collins & Aikman Corp., Philadelphia, Pa., U. S. A.)

336,576. **Tire Bead Reenforcement.** Dunlop Rubber Co., Ltd., London, and J. G. Bulger, Fort Dunlop, Birmingham.

336,585. **Elastic Cord Support.** Graham Amplion, Ltd., and G. Holdway, both of Slough.

336,624. **Tire Safety Valve.** Dunlop Rubber Co., Ltd., London, and J. Lockett, Fort Dunlop, Birmingham.

336,682. **Arch Supporters.** W. H. Southorne, Hertfordshire.

336,715. **Balloon Tire.** A. J. Musselman, Cuyahoga Falls, O., U. S. A.

336,734. **Draught Excluder.** G. Spencer Moulton & Co., Ltd., and C. W. C. Hine, both of Westminster.

336,777. **Springs.** A. Smeets, Boitsfort, Brussels.

336,794. **Gramophone Turntable.** P. J. Maffey, Southampton.

336,805. **Hair Waver.** B. V. Schofield, London.

336,813. **Puncture Locating Device.** W. R. Wilks, Westcliff-on-Sea.

336,829. **Vehicle Buffer and Drawgear.** R. T. Glascodine, R. L. Whitmore, and G. Spencer Moulton & Co., Ltd., all of Westminster.

336,872. **Eyelash Curler.** C. W. Stickel and W. E. McDonell, both of Rochester, N. Y., U. S. A.

336,961. **Machine Vibration Absorber.** British Thomson-Houston Co., Ltd., London, F. A. Fossey and D. H. Graham, both of Coventry.

337,010. **Vehicle Buffer and Drawgear.** A. Spencer, Westminster.

337,030. **Stocking.** Leicester City Hosiery Co., Ltd., and J. L. Morley, both of Leicester.

337,098. **Flexible Tubing.** C. Hammatt, London.

337,107. **Brake.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., and W. L. Avery, of India Rubber, Gutta Percha & Telegraph Works, Silvertown, both of London.

337,138. **Vehicle Resilient Mounting.** J. I. Thornycroft & Co., Ltd., London, and V. G. Barford, Motor Vehicle & Engine Works, Hampshire.

337,185. **Puncture Indicating Device.** A. E. Baxter, Surrey.

337,201. **Hair Waver.** R. Lemaire, Solingen, Germany.

337,250. **Roller.** R. Wheatley and Victoria Rubber Co., Ltd., both of Edinburgh, Scotland.

337,287. **Mud Guard.** P. P. Burbush, Buckinghamshire.

337,344. **Piston.** J. W. McQuaid, Lomita, Calif., U. S. A.

337,385. **Cutting Block.** British United Shoe Machinery Co., Ltd., and H. Barnett, both of Leicester.

337,400. **Elastic Fabric.** Comfolastic Corp., New York, N. Y., U. S. A.

337,422. **Fruit Storing Device.** F. Kidd and C. West, both of Cambridge.

337,455. **Offset Printing Machine.** W. L. Lawrence, Flintshire.

337,537. **Ball Washing Machine.** B. Ramsden, Scarborough.

337,567. **Door Holder.** H. G. Clements, Leicester, and F. J. Ruffle, Leicestershire.

337,584. **Table Game.** E. A. Bull, Glasgow, Scotland.

337,598. **Guards for Conductors.** Dunlop Rubber Co., Ltd., P. E. Lavell, both of London, and J. R. Ward, Kingston-on-Thames.

337,619. **Heel Friction Pad.** C. R. Snow, Ketchikan, Alaska.

337,652. **Tire Valve.** F. H. Gerrans, London. (A. Schrader's Son, Inc., Brooklyn, N. Y., U. S. A.)

337,654. **Vehicle Antiskid Device.** W. B. Garden, Stirlingshire.

337,655. **Motorcycle Saddle.** W. Lipsky, F. Hauser, O. J. Schumacher, and F. A. Bielefeld, (trading as Schumacher & Bielefeld), all of Hamburg, Germany.

337,780. **Gramophone Pickup.** P. D. Tyers, Watford, Hertfordshire.

337,794 and 337,835. **Fountain Pen.** G. S. Vivian, London, and Valentine & Sons, Ltd., Dundee.

337,958. **Check Elastic Valve.** S. A. H. Enghoff, Lund, Sweden.

337,984. **Bathing Shoe.** J. T. Howells, Henleaze, Bristol.

338,001. **Box.** W. Lindermann, Hamburg, Germany.

338,055. **Mat.** F. C. Brewer, Los Angeles, Calif., U. S. A.

338,066. **Collapsible Boat.** C. E. Heinke and Co., Ltd., and J. H. Blake, both of London.

Germany

515,480. **Rope or Band.** F. Krupp Grusonwerk A.G., Madgeburg-Buckau.

515,938. **Gutta Percha Cable.** Siemens Bros. & Co., Ltd., and A. E. Foster, both of London, England. Represented by B. Kugelmann, Berlin S.W. 11.

516,292. **Paving Block.** Universal Rubber Paviors, Ltd., Audenshaw, Manchester, England. Represented by B. Kugelmann, Berlin S.W. 11.

516,829. **Door Buffer.** W. Jahr, Oliva, and J. Kruger, both of Danzig. Represented by A. Kulka, Berlin-Wilmersdorf.

517,523 and 517,524. **Coat.** Meyer & Ries, Mechanische Kleiderfabrik, Hannover.

517,825. **Overshoe.** Radium Gummiwerke m.b.H., Köln-Dellbrück.

517,864. **Cattle Horn Caps.** N. Nehls, Schonberg Mecklbg.

Designs

1,147,787. **Insert for Tires.** A. Schmalhofer, Kempten, Allgau.

1,147,927. **Friction Block.** Continental Gummi-Werke A.G., Hannover.

1,148,057. **Tube.** C. Schwanitz, Gummiwerke A.G., Berlin-Reinickendorf.

1,148,201. **Elastic.** J. Baruch, Berlin S.O. 16.

1,148,350. **Stocking.** R. Hansler, Munich.

1,148,431. **Dowel.** P. Schwarze, Wanne-Eickel.

1,148,947. **Sole.** Continental Gummi-Werke A.G., Hannover.

1,149,248. **Inflatable Body.** Gummiwaren-Fabrik bei Melle Wortmann & C. Bosch, Melle-Hannover.

1,149,318. **Mat.** Mitteldeutsche Gummi- u n d Asbest - Gesellschaft m. b. H., Blankenburg a. Harz.

1,149,540. **Coat.** Regenmantelfabrik Berliner & Frischler G.m.b.H., Breslau.

1,149,719. **Surgeon's Glove.** G. Heertel Komm.-Ges., Berlin.

1,149,955. **Stocking and Trouser Protector.** E. Stegemann, Leipzig-Anger.

1,149,967. **Rubber for Perfume Bottle.** Leonhard Langbein Nachf., Cursdorf i. Th.

1,150,027. **Sponge Rubber Electrode.** A. G. Metzeler & Co., Munich.

1,150,128. **Stamp.** E. Oberhoff, Wuppertal-Barmen.

1,150,130. **Holder Window Shield.** R. Poppa, Barenstein, Bez. Chemnitz.

1,150,135. **Rubber Inset.** Karl Lieberknecht G.m.b.H., Oberlungwitz, i.S.

1,150,328. **Block Belt.** Pahl'sche Gummi- und Asbest-Gesellschaft m.b.H., Dusseldorf-Rath.

1,150,400. **Gaiter.** Gummi-Werke Elbe A.G., Klein-Wittenberg a.d.E.

1,150,481. **Tire Pressure Indicator.** F. Bischof, Hermannsdorf i. Schles.

1,150,514. **Driving Belt.** Continental Gummi-Werke A.G., Hannover.

1,150,707. **Thread.** W. Hussels, Wuppertal-Barmen.

1,150,851. **Block Belt.** L. Wallfisch, Hirschberg i. Schles.

1,151,006. **Sponge Rubber Toy.** H. Lindemann, Berlin-Zehlendorf.

1,151,235. **Stocking Protector.** O. Teichmann, Hamburg 30.

1,151,331. **Cover for Walls, Floors, Etc.** F. Szepanscky, Berlin N. 35.

1,151,509. **Bathing Hat.** Hungaria Guttapercha und Kautschukwarenfabrik A.G., Budapest, Hungary. Represented by G. Bueren, Berlin S.W. 11.

1,151,537. **Rubber Insert.** Karl Lieberknecht, G.m.b.H., Oberlungwitz, i.S.

1,151,610. **Rubber Buffer.** F. Schluter, Westerholt.

1,151,812. **Braid Work.** F. Clouth Rheinische Gummiwarenfabrik A.G., Koln-Nippes.

1,151,834. **Device for Watering Calves.** E. Schweitzer, Neu-Ulm.

1,151,845. **Sponge Pessary.** L. Pierchala, Beuthen, Bez. Liegnitz.

1,151,930. **Typewriter Key Top.** Dietsch & Ilgen, Zeulenroda.

1,152,226 and 1,152,227. **Cover for Tires.** Societe Michelin & Cie, Clermont-Ferrand, France. Represented by H. Hillecke, Berlin S.W. 48.

1,152,342. **Rubber Non-Skid.** Deutsche Fit Gesellschaft m.b.H., Frankfurt a.M.

1,152,424. **Illuminated Balloon.** F. O. Salzmann, Dresden-A.

1,152,465. **Wagon Buffer.** W. Schmellekamp, Essen.

1,152,745. **Dental Plaque.** W. Vetter, Eisenach.

1,152,840. **Parquet Floor Wiper.** R. Lorenz, Berlin-Steglitz.

1,152,849. **Bathing Accessories.** Firma M. Sternberg, Koln-Braunsfeld.

1,153,047. **Razorstrop Lining.** K. Richter, Coburg.

1,153,128. **Band with Loops.** Vereinigte Gummiband Webereien Tillmanns, Schniewind & Schmidt, Wuppertal-Elberfeld.

1,153,211. **Closure for Glasses.** K. Rudolf Beckert & Co., Dresden-A.

1,153,297. **Compressed Air Bladder.** C. Muller Gummiwarenfabrik A.G., Berlin-Weissensee.

1,153,309. **Colored Crepe Ball.** H. Engel, Berlin W. 50.

1,153,329. **Trunk Handles.** Lohmann Werke A.G., Bielefeld.

1,153,455. **Spray Tip.** A. Hartmann, Twiste bei Arolsen.

1,153,491. **Pad.** T. Thomalla, Solingen.

1,153,520. **Rubberized Belt.** E. Kubled & Co. m.b.H., Berlin Reinickendorf-West.

1,154,004. **Inflatable Mattress.** Munden-Hildesheimer Gummiwaren-Fabriken Gebruder Wetzell A.G., Hildesheim.

1,154,123. **Cup and Cone.** Firma E. Erler Kaiserallee, Berlin-Friedenau.

1,154,632. **Car Jack.** H. Dorken, Milspe i.W.

1,154,813. **Flexible Shaft Protection.** Ackermann & Schmitt, Stuttgart-Ostheim.

1,154,819. **Insert for Pulleys.** Veritas Gummiwerke A.G., Berlin-Lichterfelde.

Austria

119,102. **Dropcenter Rim.** Kromag A.G. fur Werkzeug-und Metallindustrie, Hirtenberg.

119,106. **Bathing Bag.** B. Mosonyi, Vienna.

119,564. **Tire Bead.** Michelin & Co., Clermont-Ferrand, France.

119,566. **Wheel.** F. Kopp, Ulm a. d. Donau.

119,571. **Antiskid Device.** F. Trojer, Wetzelsdorf bei Graz.

Labels

United States

38,366. **Rubber Oil.** Shoe oil. Rubber Oil Mfg. Co., Aberdeen, Wash.

38,371. **Vita-Mint Chewing Gum.** Chewing gum. Vita-Mint, Inc., New York, N. Y.

38,458. **Lime Rickey Gum.** Chewing gum. Pacific Gum Co., San Francisco, Calif.

Trade Marks

United States

277,845. **Anon-Slip.** Rug anti-slip linings. R. D. Werner, doing business as Safety Carpet Underlay Co., New York, N. Y.

277,899. Word: **"Tradition,"** between two small squares containing the year: **"1662."** Rubber pencils, etc. J. S. Staedtler, Inc., New York, N. Y.

277,902. **I. D. A.** Balls. Independent Druggists' Alliance Distributing Co., Chicago, Ill.

277,950. **Seminole Chief.** Golf balls. Miller & West, Inc., Coral Gables, Fla.

277,951. Representation of a streak of lightning, and the words: **"Lux Streak."** Golf balls. Howard Lux Co., Cleveland, O.

277,958. **Lotta Miles.** Tires and inner tubes. Kelly-Springfield Tire Co., New York, N. Y.

277,969. Diamond containing the initials: **"C. K."** Balls, etc. C. Kuramochi, Tokyo, Japan.

278,036. **PGA.** Golf balls, etc. Professional Golfers' Association of America, New York, N. Y.

278,050. **Staroline.** Tires, inner tubes, and repair patches. White Star Refining Co., Detroit, Mich.

278,102. **Bogey.** Practice golf balls. M. Fiedler, doing business as Bogey Practice Ball Co., assignor to J. Moerschel, Jr., both of Milwaukee, Wis.

278,135. Seal containing the words: **"A Fashion Model."** Footwear. Byck Bros. & Co., Louisville, Ky.

278,203. **Duralite.** Soles and heels. Essex Rubber Co., Inc., Trenton, N. J.

278,229. **Jr. Deb.** Footwear. R. H. Macy & Co., Inc., New York, N. Y.

278,234. Representation of a bell, and thereupon the words: **"Bell Brand."** Boots. United States Rubber Co., New York, N. Y.

278,254. Cluster of marks assembled in triangular form. Golf balls. Worthington Ball Co., Elyria, O.

278,257. **Peerless.** Tires and inner tubes. United States Rubber Co., New York, N. Y.

278,295. **Royalac.** Electrical conductors. United States Rubber Co., New York, N. Y.

278,305. **Dubble Pop.** Chewing gum. Frank H. Fleer Corp., Philadelphia, Pa.

278,306. **Bubble Pop.** Chewing gum. Frank H. Fleer Corp., Philadelphia, Pa.

278,314. Representation of Adam and Eve; Eve is holding an apple, and Adam is offering her a piece of chewing gum with the words: **"Take This, It's Better."** Chewing gum. Honey Chewing Gum Co., Chicago, Ill.

278,334. **Le Kid Moderne.** Perfume and medicinal atomizers. Marcel Franck, Inc., New York, N. Y.

278,342. **Roldak.** Brake linings. Russell Mfg. Co., Middletown, Conn.

278,375. Label containing the words: **"Exclusively Lansbrook. Lansburgh & Bro."** Men's wearing apparel including raincoats. Lansburgh & Bro., Washington, D. C.

278,383. **Spencer Moulton.** Railway vehicle buffing and draw springs, bearing springs, and bearing blocks. George Spencer, Moulton & Co., Ltd., London, England.

278,460. **Hootmon.** Golf balls, etc. Popular Games, Inc., Chicago, Ill.

278,481. **Not-A-Kink.** Hose. Sears, Roebuck & Co., Chicago, Ill.

278,482. **Ruby Red.** Hose. Sears, Roebuck & Co., Chicago, Ill.

278,483. **Heavy Duty.** Hose. Sears, Roebuck & Co., Chicago, Ill.

278,492. Seal containing fanciful design, and the words: **"Sealed Soles."** Footwear. Sears, Roebuck & Co., Chicago, Ill.

278,494. Seal containing the words: **"Czecho Braided Sandals."** Footwear. H. David, doing business as R. Stern Co., Paterson, N. J.

278,535. Representation of a crown and the words: **"CorOnet Brand."** Bathing receptacles, etc. Robbins & Tenney, New York, N. Y.

278,632. **Fliwait.** Raincoats. United States Rubber Co., New York, N. Y.

278,698. **Zalba.** Antioxidant. E. I. du Pont de Nemours & Co., Wilmington, Del.

278,699. **Barak.** Accelerator. E. I. du Pont de Nemours & Co., Wilmington, Del.

278,729. **Doughnut.** Tires, treads, inner tubes, non-skid devices, etc. Goodyear Tire & Rubber Co., Akron, O.

278,781. **Antox.** Antioxidant. E. I. du Pont de Nemours & Co., Wilmington, Del.

278,782. **Heliozone.** Preventive of the sun checking of rubber. E. I. du Pont de Nemours & Co., Wilmington, Del.

278,783. **Parazone.** Antioxidant. E. I. du Pont de Nemours & Co., Wilmington, Del.

278,810. Representation of a red, yellow, and blue wrapper and thereupon the words: **"Kis-me Bubblers."** Chewing gum. American Chicle Co., Long Island City, N. Y.

278,811. **Vel-Coe.** Brake lining. Raybestos-Manhattan, Inc., Passaic, N. J.

278,825. **Dubble Sucker.** Chewing gum. Frank H. Fleer Corp., Philadelphia, Pa.

278,906. **Zelatone.** Accelerator. E. I. du Pont de Nemours & Co., Wilmington, Del.

278,922. Label consisting of a coat-of-arms and the word: **"Dobbs."** Golf balls, etc. Dobbs & Co., New York, N. Y.

278,953. **Go-be-tween.** Electric cords. Griffin Appliance Corp., Chicago, Ill.

278,954. Colored label consisting of two coats-of-arms and the words: **"Griffin Safety Cord."** Electrical conductor cords, terminal plugs, lamp sockets, etc. Griffin Appliance Corp., Chicago, Ill.

279,031. **Reign Styck.** Raincoats. S. C. Neidlinger, Montclair, N. J.

279,035. **Matex.** Gloves. Massillon Rubber Co., Massillon, O.

279,041. Representation of a wreath and shield and thereupon the words:

"Shield. Goodyear's India Rubber Glove Co., Naugatuck, Conn., U. S. A." Hot water bottles and syringe bags. Goodyear's India Rubber Glove Mfg. Co., Naugatuck, Conn.

279,042. **St. Regis.** Medical atomizers and gloves. McKesson & Robbins, Inc., Bridgeport, Conn.

279,049. **Miss New York.** Perfume atomizers. Croyden Products, Inc., New York, N. Y.

279,159 and 279,160. Cluster of marks assembled in triangular form. Golf balls. Worthington Ball Co., Elyria, O.

279,162. **Skips.** Footwear. Montgomery Ward & Co., Inc., Chicago, Ill.

279,189. **Silent Grip.** Brake lining. Anchor Packing Co., Philadelphia, Pa.

279,219. **Blony.** Chewing gum. J. W. Bowman, doing business as By Gum Co., Philadelphia, Pa.

279,303. **Hydro.** Brake and clutch linings. Raybestos-Manhattan, Inc., Passaic, N. J.

Dominion of Canada

51,072. **The Winner.** Pencils, erasers, rubber bands, etc. A. W. Faber Castell Bleistift Fabrik A.G., Stein, Germany.

51,073. **Aeternal.** Pencils, erasers, rubber bands, etc. A. W. Faber Castell Bleistift Fabrik A.G., Stein, Germany.

51,111. **Penco.** Footwear. J. C. Penney Co., New York, N. Y., U. S. A.

51,134. Representation of the full-length figure of a girl. Sanitary aprons, belts, dress shields, sheetings, etc. J. C. Penney Co., New York, N. Y., U. S. A.

51,148. **Atlas.** Balls, etc. O. E. Lewis, Woodford, London, E. 18, England.

51,194. Monogram of the letters: **"J. M."** and the words: **"Johns-Manville."** Brake and friction linings, rubber valves and sleeves, etc. Canadian Johns-Manville Co., Ltd., Montreal, P. Q.

United Kingdom

504,755. **Bates.** Hockey and cricket balls. Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham.

509,678. **Onco.** Rubber sheeting as a leather substitute. Brown Co., Portland, Me., U. S. A.

511,207. **Pancrom Will Not Mark Floors.** Heels and soles of rubber. Panther Rubber Co., Ltd., Sherbrooke, P. Q., Canada.

515,355. **Atlas.** Tires and tubes. Atlas Supply Co., New York, N. Y., U. S. A.

515,490. Representation of a blue and gold flag. Goods manufactured from rubber and gutta percha included in Class 40. Goodyear Tire & Rubber Co., Akron, O., U. S. A.

515,605. **Pontan.** Sheeting in which rubber predominates. E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.

515,930. **Stella.** Hats of textile, impregnated with rubber. P. Frankenstein & Sons (Manchester), Ltd., Manchester.

517,109. **Mersylite.** Insulated cables. Mersey Cable Works, Ltd., Liverpool.

517,164. **Cyclops.** Goods manufactured from rubber and gutta percha not included in classes other than Class 40. Boston Woven Hose & Rubber Co., Cambridge, Mass., U. S. A.

517,187. Circle containing representation of a bison and the word: **"Bison."** Belting. Boston Woven Hose & Rubber Co., Cambridge, Mass., U. S. A.

517,759. **Supervo-Servoo.** Pneumatic tires. E. B. Killen, London.

517,760. **Supervo.** Pneumatic tires. E. B. Killen, London.

518,180. **Dailite.** Footwear. Harboro' Rubber Co., Leicestershire.

518,185. **Buess.** Pneumatic tires. E. B. Killen, London.

518,573. **Bullite.** All goods included in Class 40. Leicester Rubber Co., Ltd., Leicester.

Designs

United States

82,867. **Tire.** Term 3½ years. F. S. Young, assignor to May Seed & Nursery Co., both of Shenandoah, Iowa.

82,988. **Sole.** Term 7 years. W. B. Hopwood, assignor to Beacon Falls Rubber Shoe Co., both of Beacon Falls, Conn.

82,990. **Sandal.** Term 14 years. C. W. Hubbell, Naugatuck, Conn., assignor to Revere Rubber Co., Providence, R. I.

Dominion of Canada

8,981, 8,982, 8,983. **Tire.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

European Notes

(Continued from page 90)

half the rim is formed by flanging one of the disks, and the other half is made detachable.

A rubber tread, reenforced by a strip of perforated metal, is held on the rim by the inturned flanges. It is claimed that this construction provides a better cushion for the saw than does the older method in which a loose rubber band was cemented on a flat rim. The rubber tread can be removed and replaced when necessary without any cementing or vulcanizing.

Poland

The report of the Pepege Polish Rubber Co. states that the factories in Grudziadz, Warsaw, and Wabrzezno, during 1929-30 and 1928-29, produced the following quantities of rubber goods: 2,352,373 pairs of galoshes, snow shoes, and boots last year against 2,234,936 pairs the year before; 4,892,894 pairs of sports and bathing shoes against 6,116,665 pairs; 222,590 cycle tires and tubes against 288,097; 509 automobile tires and tubes; 106,757 raincoats and jackets against 98,305; 552,202 square meters of rubberized fabric against 353,705 square meters; 198,437 kilos of molded technical goods against 35,000 kilos. It will be noted that the decline was sharp in the output of footwear for sports, bathing, beach, etc., during the year as compared with 1928-29; the output of cycle tires and tubes dropped also; while the other articles increased. The net profits of the past year were 681,413 zloty (zloty=$0.1122), to which is added a carry-forward of 157,564 zloty. No dividend was declared because of the present economic condition and the fluctuations in the price for raw materials, and the need for strengthening the working funds. The firm had closed its works for a few weeks, but during the latter part of January some operations were resumed in part of the works and the normal spring output began. A large new factory for rubber footwear manufacture has been established in Warsaw by the Latvian-Polish firm Rygawar A. G.

Roumania

The Dunlop Rubber Co., Ltd., London, England, recently established a sales branch in Bucharest, Roumania. The company has a capital of 5,000,000 lei (lei= $.00598), divided into 5,000 shares of 1,000 lei. Of this capital Janus M. Leisch took 1,000,000 lei; Eugen Behles, 800,000; Sacha Roman, 1,050,000; George Nenisor, 500,000; James Young, 550,000; Carol Csallner, 500,000; and Theodora Roman, 600,000 lei. The first board of directors includes J. L. Graham, H. A. Broatbet, and Sacha Roman.

France

Etablissements Bergougnan reports a profit of 20,084,012 francs, not including 3,945,215 francs carried forward from the preceding year. The dividend has been fixed at 60 francs a share of the old issue and 41.25 francs for the new issue. 3,114,791 francs were carried forward.

N. E. I. Notes

(Continued from page 91)

Progress with selected material does not appear to be nearly so rapid in Java as in Sumatra. In a recent discussion of planting material Dr. Tengwall, of the Rubber Experiment Station of Buitenzorg, stated that from data obtained from 355 estates showing the different kinds of material used over a planted area of 57,760 hectares (hectare = 2.5 acres) it appeared that only 14.8 per cent, or 8,512 hectares, were under buddings; 19.7 per cent, or 11,395 hectares, under mixed buddings and seedlings; 5.3 per cent, or 3,048 hectares, were planted with seed from clones; 25.2 per cent, or 14,578 hectares, with mother trees; and actually 35 per cent, or 20,227 hectares, were planted with ordinary unselected seed.

Dr. Tengwall, in discussing the problem of increased productions, asks whether, when the areas planted with selected material had all reached the producing stage, it would not appear that the experiments had actually rendered a disservice to the rubber industry by raising the outputs? To this question he answers that no one need fear in this regard since at present only 4 per cent of the planted area of about 3,000,000 hectares was under buddings. Since, furthermore, very little new planting has lately been undertaken, it would be a long time before the effect of the buddings would be felt, so that budding could be continued and no fear entertained, for the present at least.

MARKET REVIEWS

Crude Rubber

RUBBER BULL POINTS

1. **Malayan shipments for January were 41,579 tons, against 41,887 tons in December and 52,535 in January, 1930.**
2. **Far Eastern estates are expected to cut production drastically, especially under the low prices which prevailed during most of February.**
3. **Ceylon shipments in January were 6,746 tons, against 6,932 in December, and 7,708 in January, 1930.**

RUBBER BEAR POINTS

1. **Consumption of crude rubber in the United States during January was 28,557 long tons; while imports were 37,098 long tons.**
2. **Stocks on hand and afloat amounted to 265,-675 tons at the end of January, a record total.**
3. **British stocks continue to increase, amounting to approximately 126.760 tons on February 21, 1931.**
4. **Dealers' stocks at Singapore, Penang, etc., at the end of January were 43,698 tons, against 40,343 tons the previous month and 40,293 tons a year ago.**
5. **Harbor Board stocks at the end of January were 6,104 tons, against 5.569 tons the previous month, and 3,555 tons a year ago.**

New York Exchange

THE curtailment of rubber production which has been expected for so long has not as yet been effected. As far back as last November it was predicted that many native estates would be forced into bankruptcy, and the others would have to cut production drastically because of the low prices.

But with the improvement in prices in the latter part of 1930 those predictions failed to come true. November and December, two of the best tapping months, saw large stocks of rubber shipped to all the principal centers. To a large degree that movement has extended into January and February of the new year. Stocks on hand reach new record high levels each week.

Prices, meanwhile, have declined under the pressure of the overwhelmingly large stocks until they are close to the record lows. Part of the decline may also be attributed to the low rate of consumption. In January, consumption was only 28,557 tons instead of the expected 30,000 or 31,-000 tons. Consumption for February will be low because of the short month. Shipments from Malaya are also expected to be less for the same reason. Incidentally Malayan shipments showed a decline in January of some 11,000 tons from December, but the many bearish factors obscured this constructive piece of news.

Reports from tire manufacturers are to the effect that production is being increased, but this higher rate of activity has not been reflected in the consumption figures. What manufacturers are doing, most likely, is stocking up their shelves to some degree in anticipation of spring business.

The rubber market will take some time to work itself out of the difficulties that surround it. Improvement can not be expected until the restraining burden of overproduction is lightened. The strongest influence in that direction at present is the low level of prices.

Week ended January 31. Prices eased gradually under pressure of the large stocks that continue to accumulate, dropping below the 8-cent level to close the week at from 7.70 to 7.75 cents. Estimates are for an increase of 2,200 tons in the British stocks, 1,300 tons in Liverpool, and 900 tons in London.

It was reported that the N. E. I. shipments for December totaled 22,277 tons, compared with 20,053 tons in November. For the year 1930 exports amounted to 268,528 tons, compared with 287,816 tons exported during 1929, and with 263,129 tons during 1928. November and December are usually the heaviest months for shipments; so later figures are expected to be much more favorable than those reported.

The London market was easy after the estimate for another increase in stocks was known, since stocks had already increased in the previous week by 834 tons. Commission houses continued the slow liquidation which has been going on for several weeks.

Prices at the close of January 31 on the No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Feb.	...	...	7.75	7.75
Mar.	...	...	7.86/7.90	7.90/7.95
Apr.	...	...	7.94	7.99
May	8.09	8.05	8.03/8.05	8.08/8.11
June	...	...	8.12	8.17
July	8.25	8.21	8.21	8.27
Aug.	...	...	8.30	8.37
Sept.	8.43	8.40	8.40/8.41	8.48
Oct.	...	...	8.50	8.58
Nov.	...	...	8.60	8.68
Dec.	...	...	8.70	8.78
Spot	...	...	7.80	7.81

Week ended February 7. When the figures for January shipments from Malaya were published on Tuesday, prices recovered about fifteen points from the levels recorded on the previous day. Reactions in the next few days, however, wiped out the gains so that for the week the loss was about 20 points. Quotations slipped to 7.45 cents at one time, only 25 points above the record low point reached last October.

Total shipments of crude rubber by Malaya were approximately 11,000 tons below the same month last year and slightly below the December total. Gross exports were 41,579 tons, compared with 41,889 tons in December and 52,535 tons exported in January, 1930. American consuming requirements in January were estimated to require 30,000 to 31,000 tons of the total Malayan outgo last month, leaving only a little more than 10,000 tons for all other consuming countries, and surplus to add to stocks here.

Ceylon exports in January were also slightly more favorable than in the previous month. Net exports of crude rubber from Ceylon during January, 1931, were 6,746 tons compared with 6,932 tons during December and with 7,708 tons exported during January, 1930.

Of this amount the United States received 4,060 tons; United Kingdom 1,748 tons; and all other countries 938 tons. During December the United States received 3,902 tons; United Kingdom, 1,522 tons; and other countries 1,508 tons. February, March, and April are the wintering months in Ceylon; so rubber exports are expected to be materially reduced in these three months.

Prices at the close of February 7 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Feb.	...	...	7.55	7.50
Mar.	7.68	7.67	7.68	7.66/7.70
Apr.	...	...	7.77	7.74
May	7.87	7.85	7.87	7.81/7.85
June	...	...	7.96	7.91
July	...	...	8.05/8.10	8.00/8.05
Aug.	...	...	8.14	8.10
Sept.	8.25	8.25	8.23/8.30	8.19
Oct.	8.39	8.39	8.35/8.40	8.34
Nov.	...	...	8.47	8.46
Dec.	...	...	8.59	8.58
Jan.	...	...	8.70	8.68
Spot	...	...	7.70	7.55

Week ended February 14. On Tuesday two of the most prominent commission

The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLEARING HOUSE PRICES—CENTS PER POUND—"NO. 1 STANDARD" CONTRACTS

Positions 1931	January, 1931 26	27	28	29	30	31	February, 1931 2	3	4	5	6	7	9	10	11	12*	13	14	16	17	18	19	20	21
Jan.	7.95	7.90	7.90	7.84	7.74	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Feb.	8.00	7.95	7.95	7.85	7.75	7.75	7.70	7.85	7.55	7.45	7.50	7.55	7.55	7.95	7.85	....	7.75	7.55	7.55	7.55	7.52	7.50	7.45	7.26
Mar.	8.14	8.15	8.06	8.00	7.90	7.86	7.80	7.95	7.78	7.64	7.66	7.68	7.76	8.07	7.96	....	7.75	7.55	7.59	7.60	7.55	7.53	7.45	7.36
Apr.	8.22	8.25	8.18	8.10	7.99	7.94	7.88	8.03	7.87	7.72	7.74	7.77	7.86	8.16	8.05	....	7.90	7.77	7.70	7.69	7.65	7.64	7.55	7.48
May	8.31	8.35	8.30	8.20	8.08	8.03	7.94	8.10	7.95	7.80	7.81	7.87	7.96	8.25	8.15	....	8.05	7.80	7.77	7.79	7.75	7.72	7.65	7.60
June	8.38	8.43	8.38	8.28	8.17	8.12	8.02	8.18	8.04	7.90	7.91	7.96	8.05	8.35	8.25	....	8.13	7.88	7.87	7.88	7.85	7.84	7.77	7.70
July	8.45	8.50	8.45	8.35	8.27	8.21	8.10	8.28	8.12	8.00	8.00	8.05	8.15	8.45	8.35	....	8.20	7 97	7.97	7.97	7.95	7.92	7.90	7.80
Aug.	8.55	8.60	8.55	8.45	8.37	8.30	8.20	8.34	8.22	8.09	8.10	8.14	8.25	8.54	8.45	....	8.30	8.08	8.08	8.08	8.05	8.03	7.98	7.90
Sept.	8.66	8.70	8.65	8.54	8.48	8.40	8.30	8.48	8.31	8.17	8.19	8.23	8.35	8.63	8.55	....	8.40	8.20	8.19	8.19	8.15	8.14	8.07	8.00
Oct.	8.77	8.85	8.75	8.65	8.58	8.50	8.40	8.61	8.41	8.28	8.34	8.35	8.47	8.75	8.67	....	8.54	8.32	8.31	8.31	8.28	8.25	8.20	8.12
Nov.	8.88	8.95	8.86	8.76	8.68	8.60	8.50	8.72	8.51	8.38	8.46	8.47	8.59	8.87	8.79	....	8.70	8.43	8.42	8.43	8.40	8.35	8.30	8.23
Dec.	8.99	9.05	8.97	8.87	8.78	8.70	8.60	8.84	8.60	8.49	8.58	8.59	8.70	8.99	8.90	....	8.80	8.55	8.52	8.55	8.50	8.50	8.40	8.35
1932																								
Jan.	....	....	....	....	....	....	8.70	8.94	8.71	8.60	8.68	8.70	8.82	9.11	9.02	....	8.90	8.66	8.64	8.65	8.59	8.60	8.50	8.46

* Holiday.

RUBBER EXCHANGE ACTIVITIES

Week Ended	Transactions: Contracts Sold, Number	Tons	Transferable Notices	Week-End Tone
Jan. 31	421	1,052.5	80	Easier
Feb. 7	525	1,312.5	16	Steady
Feb. 14	703	1,757.5	10	Barely steady
Feb. 21	801	2,002.5	16	Quiet
Totals	2,450	6,125.0	122*	

* Actual deliveries of rubber.

houses were credited with making heavy purchases, and under this stimulus rubber prices mounted 28 to 40 points on the No. 1 Standard contract. The net change for the week, however, was only a gain of 10 to 20 points.

The slight rally which rubber experienced for a short period was partly influenced by the cotton, grain, and stock markets, all of which were strong. The bulls had full charge in these markets, and for a few days things looked rosy. Sales on the stock exchange were almost double what they had been. But no one had the temerity to say definitely that better prices would continue to rule.

The gain in rubber was short-lived. Following the holiday, reports of an increase in dealers' supplies in the Far East sent the market off for losses as high as 21 points.

Dealers' stocks were not only some 2,500 tons larger on a dry basis than those at the year-end, but about 7,500 tons above those for January, 1930. Not the size of the increase, but the unfavorable significance of the report brought out the selling. The figures were a keen disappointment to those who had been led to believe that rubber production was finally being curtailed.

The trouble seems to be that the European producers are waiting for the native producers to curtail, with the result that many of the planters had been producing at capacity. But it is expected that the efforts begun in January, 1931, will soon show results.

United States consumption, meanwhile, is not meeting expectations. The January figures were released on Saturday, showing the unexpectedly small total of 28,557 tons, instead of the 30,000 or 31,000 estimated. Imports were 37,098 tons. London and Liverpool stocks at the end of last week had reached 124,435 tons. The market finds it hard to shake off the burden of these excessive quantities of rubber in the face of lower consumption figures.

In light of the increasing production figures an editorial in the *Malayan Tin and Rubber Journal* on "The Law of Supply and Demand" is significant.

"Production is diminishing," said the editorial. ". . . . once the demand for rubber speeds up again, the supply will not increase at the same speed. Apart from disease badly damaging, if not ruining, abandoned rubber areas, and apart from native producers being forced to overtap, thus ruining their trees in an effort to get sufficient money to supply a living, Malaya, at least, will not be able to give consumers all the rubber they want when the demand increases, because the rubber estates have had to part with a great proportion of their labor forces."

The same journal carried another editorial entitled "Rubber: A Gift to America," in which it said: "All the conditions that tend to encourage the development and spread of a bad epidemic disease are present in the rubber plantations of the Mideast to an extent of which those whose experience is limited to crops grown in temperate zones can form but the smallest conception."

The Department of Commerce, which reported these editorials, stated that no alarming evidence in support of these factors had yet some to light.

Prices on No. 1 Standard contract at the close of February 14 were:

Position	High	Low	Close	Previous Close
Feb.	...	...	7.55	7.75
Mar.	7.68	7.68	7.55/7.59	7.75/7.80
Apr.	...	...	7.77	7.90
May	7.85	7.85	7.80/7.84	8.05
June	...	...	7.88	8.13
July	8.02	8.00	7.97	8.20
Aug.	...	...	8.08	8.30
Sept.	8.20	8.20	8.20	8.40
Oct.	...	...	8.32	8.54
Nov.	...	...	8.43	8.70
Dec.	...	...	8.55/8.58	8.80
Jan.	...	...	8.66	8.90
Spot	...	...	7.63	7.80

Week ended February 21. Switching operations and settling up accounts in preparation for the first notice day in March were responsible for most of the activity in crude rubber for the past week. Otherwise the market was a poor affair with prices sliding closer and closer to the record low levels of last October. At the end of the week the February position was quoted at 7.26 cents and the March position at 7.36 cents. Since last Saturday prices have declined from 19 to 30 points.

The largest drop was registered on Saturday. The reason was partly because of the holiday on Monday, but principally because of the estimated increase of over 1,600 tons in the stocks at London and Liverpool. This brings the total at these two centers up to approximately 126,760 tons.

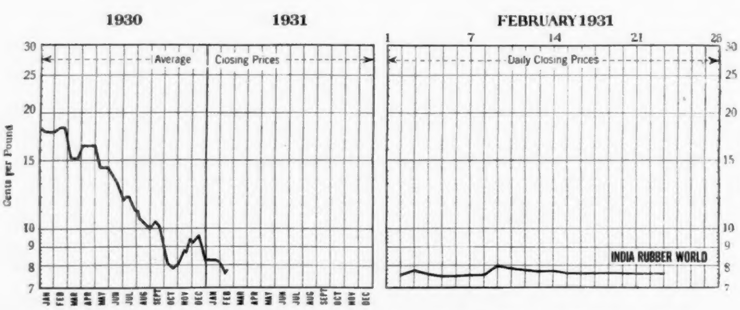
Preliminary estimates place Malayan shipments for February at 38,000 tons. Dealers' stocks at Singapore, Penang, etc., at the end of January were reported at 43,698 tons (estimated dry 42,202 tons), against 40,343 tons the previous month and 40,293 tons a year ago. Harbor Board stocks the end of January were 6,104 tons, against 5,569 tons the previous month and 3,555 tons a year ago.

The Rubber Manufacturers Association reported that stocks of crude rubber on hand at the end of January amounted to 209,487 tons, which compares with 202,246 tons at the close of December. The combined American supplies, stocks plus amount afloat at the close of January, were 265,675 tons, a record total. In the face of these statistics the rubber market could make no headway. It is also probable that these conditions will continue to prevail for the next few months.

The only sign of activity in the rubber industry has come from the tire manufacturers, but as has been pointed out, "Plentiful supplies at very cheap costs have given the manufacturers a highly competitive and unprofitable tire market and forced rubber merchants out of the business."

The Journal of Commerce also reported that a large American manufacturer had closed a contract in London calling for a two years' supply of crude.

"Details of this deal were withheld, but



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

	January, 1931						February, 1931																	
	26	27	28	29	30	31	2	3	4	5	6	7	9	10	11	12*	13	14	16	17	18	19	20	21
Ribbed Smoked Sheet	8	8	7⅞	7⅞	7⅞	7⅞	7⅝	7⅞	7⅝	7½	7½	7⅝	7⅝	8	7⅞	...	7¾	7¾	7⅝	7⅝	7⅝	7⅝	7½	7⅜
No. 1 Thin Latex Crepe	8¼	8¼	8¼	8¼	8⅛	8¼	8	8⅛	8	7¾	7¾	7⅞	8	8¼	8⅛	...	8	8	7⅞	7⅞	7⅞	7⅞	7¾	7⅝
No. 1 Thick Latex Crepe	8	8	7⅞	7⅞	7⅞	7⅞	7⅝	7⅞	7⅝	7½	7½	7⅝	7⅝	8	7⅞	...	7¾	7¾	7⅝	7⅝	7⅝	7⅝	7½	7½
No. 1 Brown Crepe	7¾	7¾	7⅝	7⅝	7½	7⅝	7½	7⅝	7½	7¼	7¼	7½	7½	7⅞	7¾	...	7⅝	7⅝	7⅜	7⅜	7⅜	7⅜	7¼	7¼
No. 2 Brown Crepe	7½	7½	7⅜	7⅜	7¼	7½	7¼	7⅜	7⅜	7⅛	7	7¼	7⅜	7⅝	7½	...	7⅜	7⅜	7¼	7¼	7¼	7¼	7⅛	7
No. 2 Amber	7¾	7¾	7⅝	7⅝	7½	7⅝	7⅜	7½	7½	7¼	7¼	7½	7½	7¾	7¾	...	7½	7½	7⅜	7⅜	7⅜	7⅜	7¼	7¼
No. 3 Amber	7½	7½	7⅜	7⅜	7⅜	7½	7¼	7⅜	7⅜	7⅛	7⅛	7⅜	7⅜	7½	7½	...	7⅜	7⅜	7¼	7¼	7¼	7¼	7⅛	7
No. 4 Amber	7⅜	7⅜	7¼	7¼	7¼	7⅜	7	7⅛	7⅛	7	7	7⅛	7⅛	7¼	7¼	...	7⅛	7⅛	7	7	7	7	6⅞	6⅝
Rolled Brown	7⅛	7⅛	7¼	7⅛	7⅛	7⅛	6⅞	7	7	6⅞	6⅞	6⅞	7	7⅛	7⅛	...	7	7	6⅝	6⅝	6⅝	6⅝	6⅝	6½

* Holiday.

it is learned that it was consummated above present market levels, that deliveries would be spread out and that two large New York banks had supplied the necessary guarantees of payment."

Prices at the close of February 21 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Feb.	...	...	7.26	7.45
Mar.	...	...	7.36/7.40	7.45
Apr.	...	...	7.48	7.55
May	7.60	7.60	7.60/7.64	7.65/7.70
June	...	...	7.70	7.77
July	7.80	7.80	7.80/7.84	7.90
Aug.	...	...	7.90	7.98
Sept.	8.01	8.00	8.00/8.04	8.07/8.10
Oct.	...	...	8.12	8.20
Nov.	...	...	8.23	8.30
Dec.	8.35	8.35	8.35	8.40
Jan.	...	...	8.46	8.50
Spot	...	...	7.42	7.46

On February 24 spot ribbed smoked sheets closed at 7.35 cents nominal.

Price Differentials

Adjustment Committee of the Rubber Exchange of New York has set the following price differentials on various grades of Hevea Plantation rubber for the old "A" contract deliveries during March:

Off quality first latex crepe at two-tenths of a cent (.2c) per pound.

Good f.a.q. ribbed smoked sheets at thirty-five one-hundredths of a cent (.35c) per pound.

Ordinary f.a.q. ribbed smoked sheets at six-tenths of a cent (.6c) per pound.

The Adjustment Committee on February 24 fixed the price differentials between the various grades of Hevea plantation rubber which shall prevail on all deliveries against the new "A" contracts for March, 1931, as follows: No. 2 Crepe (thick or thin) at 20 points; No. 2 Ribbed smoked sheets at 15 points; No. 3 Ribbed smoked sheets at 30 points; No. 4 Ribbed smoked sheets at 55 points; No. 5 Ribbed smoked sheets at 80 points; Limit of allowance on No. 2 Crepe at 25 points; Allowance on rubber delivered in bales at 13 points.

N. Y. Outside Market

Each drop in prices, of course, attracts some trade buying, but the drops have been so frequent in the last two months that manufacturers are pretty well stocked. In fact one of the "Big Five" is reported to have contracted in London for two years' supply of rubber at a little better than present prices.

Even at present, when manufacturers normally would be buying extensively for their spring requirements, sales are below normal. They have enough rubber to last them for a long time; and if they don't have enough, they see no need for haste in filling their requirements.

It will take a good while before the heavy stocks accumulated in the various markets are reduced to a workable basis. In the meantime manufacturers can buy rubber in their own good time and almost at their own price.

Predictions of better business by Spring were made by a number of manufacturers, but up to the present time no indication of it has been seen on the rubber market. The action of the stock and other markets may presage a return of better business; and we can only hope that the return of normal business, if it comes, will extend itself to rubber.

Week ended January 31. While Exchange contracts dropped below the 8-cent level, prices on the outside market remained steady at or above that level until the close of the week when some selling was reported at 7⅞ cents. Ambers and browns were steady.

Factory buying was good early in the week, but later purchases were held up in anticipation of lower levels. Operations at tire factories were reported to be still at a satisfactory rate, while an authority in the market placed weekly output schedules in the Akron district as follows: Goodyear, 240,000 casings; Goodrich, 125,000; Firestone, 125,000; General, 22,000; Seiberling, 15,000; India, 7,500; Mohawk, 6,000; Mansfield, 24,000. In addition, production at the United States Rubber's plants at Detroit, Eau Claire, and Los Angeles were placed somewhere between 160,000 and 175,000 tires weekly.

The Journal of Commerce reported evidences of curtailed production abroad as follows: A London paper stated that twenty-three estates, which produced 39,935 tons of rubber last year, were now on an annual output basis of 23,313 tons. Thirty-eight additional estates, which turned out 60,783 tons in 1930, are now on a basis of 38,636 tons. United Serdang, prominent producer, which last year accounted for the production of 7,200,000 pounds, this year estimates its production at no more than 4,800,000 pounds.

Figgis & Co., London broker, in its annual review declared: "On some estates in Malaya costs are reported to have been brought down to 3d. f.o.b., but this allows nothing for upkeep, or for bringing into bearing young areas."

Prices at the close of January 31 were:

New York Quotations

Following are New York outside market rubber quotations for one year ago, one month ago, and Feb. 24, the current date

Plantation Hevea	February 24, 1930	January 26, 1931	February 24, 1931
Rubber latex (Hevea)	$1.25 @	$0.75 @	$0.75 @
Sheet			
Ribbed, smoked, spot	.16½ @	.08¼ @	.07½ @
February-March	.16½ @ .16⅝	.08¼ @ .08⅜	.07½ @
April-June	.16¾ @ .17	.08½ @ .08⅝	.07¾ @
July-September	.17¼ @ .17½	.08⅞ @ .09	.08 @
CREPE			
No. 1 Thin latex (first latex) spot	.16¾ @ .17	.08⅝ @ .08¾	.07¾ @ .08
February-March	.16¾ @ .17	.08⅜ @ .08⅞	.07⅞ @ .08
April-June	.17 @ .17½	.08⅞ @ .09	.08 @ .08¼
July-September	.17½ @ .18	.09¼ @ .09½	.08¼ @ .08½
No. 2 Amber, spot ("B" blanket)	.15¼ @	.07¾ @ .08	.07⅛ @ .07⅜
February-March	.15¼ @	.07⅝ @ .08	.07⅛ @ .07⅜
April-June	.15½ @	.08¼ @ .08½	.07⅜ @ .07⅝
July-September	.16 @	.08½ @ .08¾	.07⅝ @ .07¾
No. 3 Amber, spot ("C" blanket)	.15 @	.07½ @ .07¾	.07 @ .07¼
No. 1 Brown, clean light, thin	.15¼ @	.07¾ @ .08	.07⅛ @
No. 2 Brown, clean, thin	.14⅞ @ .15	.07½ @ .07¾	.06⅞ @
Brown, roll	.10½ @ .10¾	.07¼ @ .07⅜	.06⅝ @ .06¾
East Indian			
PONTIANAK			
Banjermasin	.09 @	.08 @	.05 @
Pressed block	.15 @	.12 @	.12 @
Sarawak	.09 @	.12 @	.05 @
South American			
PARAS			
Upriver, fine	.17⅜ @	.10¼ @	.08¾ @
Upriver, fine	*.22½ @	*.14¼ @	*.11¾ @
Upriver, coarse	.08½ @	.06¾ @	.05½ @
Upriver, coarse	*.14½ @	*.09¾ @	*.08¾ @

South American	February 24, 1930	January 26, 1931	February 24, 1931
PARAS—*Continued*			
Islands, fine	$0.16¼ @	$0.10 @	$0.08½ @
Islands, fine	*.22¼ @	*.14 @	*.11½ @
Acre, Bolivian, fine	.17¾ @	.10½ @	.08⅞ @
Acre, Bolivian, fine	*.23 @	*.14½ @	*.12 @
Beni, Bolivian	.18 @	.10¾ @	.09 @
Madeira, fine	.17⅜ @	.10¼ @	.08¾ @
CAUCHO			
Upper caucho ball	.08 @	.06 @	.05 @
Upper caucho ball	*.14¼ @	*.09¾ @	*.08¾ @
Lower caucho ball	.07½ @	.05½ @	.04¾ @
Manicobas			
Ceará negro heads	†.19 @	@	@
Ceará scrap	†.11 @	@	@
Manicoba, 30% guaranteed	†.21 @	†.12 @	†.05 @
Mangabiera, thin sheet	†.21 @	†.14 @	†.05 @
Guayule			
Duro, washed and dried	.17 @	.15 @	.14 @
Ampar	.18 @	.16 @	.15 @
Gutta Percha			
Gutta Siak	.16½ @ .17	.13 @ .13½	.12½ @
Gutta Soh	.27 @	.26 @	.24 @
Red Macassar	2.50 @	2.50 @	1.75 @
Balata			
Block, Ciudad Bolivar	.40 @ .41	.30 @	.29 @
Colombia	.34 @	@	@
Manaos block	.39 @	.35 @	.33 @
Surinam sheet	.51 @ .52	.56 @	.56 @
Amber	.53½ @	.59 @	.58 @

* Washed and dried crepe. Shipment from Brazil.
† Nominal.

Spot	Jan. 31	Month Ago	Year Ago
Crepe	8¼	8¾	15¾
Ribs	7⅞	8⅜	15⅛
Upriver fine....	10¾	12	16⅝

Week ended February 7. Manufacturers bought fairly heavily in the last week on every decline that occurred in the market for physical rubber.

Offerings were made on Monday at 7¾ cents, close to the record low of 7⅜ cents registered last year. The market rallied in response to lower shipments from Malaya, but at the end of the week quotations were 7⅝ cents, with 7½ cents bid. Buyers were active on each of the dips, even if the cut was only ⅛-cent. Standard ribs, standard thick latex, and pale thin latex were bought well, but prices in ambers and browns also remained firm.

Malayan shipments were 41,500 tons, 11,000 tons less than in January, 1930. Ceylon shipments were 6,746 tons, compared with 7,708 exported in January, 1930.

February consumption was estimated at about 31,000 tons, about the same as January, but March consumption was placed at 35,000 tons. On this basis the total for the first quarter of 1931 would be 97,000 tons, compared with 105,000 tons during the first three months of 1930.

An indication of how severely the rubber industry was hit in the depression was given when The B. F. Goodrich Co. published figures showing the results of operations in 1930. Sales declined $9,400,000, while the inventory was written down to market prices on December 31. The net loss for the year was $8,400,000, compared with a profit of $7,446,310 in 1929. The write-down in inventory values was a departure from the company's former policy, for cost prices had been carried heretofore; but the new policy puts the company on a more solid basis to start the new year.

Prices at the close of February 7 were:

Spot	Feb. 7	Month Ago	Year Ago
Crepe	7⅞	8⅝	15⅞
Ribs	7⅝	8¼	15½
Upriver fine....	10¼	12	16¾

Week ended February 14. Good gains were registered in the actuals market, with operators buying fair quantities. Increased activity by rubber manufacturers had a steadying effect, and it was learned that a good demand for spots and nearbys had materialized in London. The bullish upturn in stocks and cotton also had its effect on the market.

But outside influences lost their beneficial effect on Saturday when the disappointing consumption figures for January were released. Consumption was put at 28,557 tons, with imports of 37,098 tons. This report sent the market off about ten points in the half-day's trading.

With production showing no signs of curtailment and with consumption dropping off, the possibility of reducing the large stocks on hand seems remote.

It was reported on Wednesday that The Goodyear Tire & Rubber Co. had increased production by 10,000 tires to a weekly operating schedule of 250,000 casings.

Prices at the close of February 14 were:

Spot	Feb. 14	Month Ago	Year Ago
Crepe	8	8⅞	16½
Ribs	7¾	8½	15⅞
Upriver fine....	7½	11½	17

Week ended February 21. Paying no attention to the other markets, crude rubber was dull, with prices on the decline.

A spread of one cent in March and December induced a number of switching operations in these two months, but otherwise buyers were scarce. By this time most of the manufacturers must be covered and buying is more for speculation than for anything else.

British stocks keep piling up, with the estimate for this week placing the increase at 1,650 tons. Shipments from Malaya for February are expected to be about 38,000 tons, far in excess of requirements.

An index in *The United States Daily* is interesting for the light it throws on the course of the rubber market. In January, 1930, the index stood at 31.1. In December, 1930, it was at 18.6, while for January, 1931 it was 17.1. (1926 prices are equal to 100). The course of prices as shown by these figures is interesting, but more interesting is the figure which gives the purchasing power of the dollar in January, 1931. The rubber dollar buys more than any other dollar. The index places its value at 5.848. Another dollar that has a large purchasing value is the auto tire dollar, which is worth 2.188 as compared with 1926. Prices for tires, however, did not have the wide spread shown by crude rubber. In January, 1930, the index for tires stood at 55.2; in December, 1930, at 51.3; and in January, 1931, at 45.7.

Prices at the close of February 21 were:

Spot	Feb. 21	Month Ago	Year Ago
Crepe	7⅝	8⅜	16⅞
Ribs	7⅜	8⅛	16⅜
Upriver fine....	9¼	11¼	17

The market is extremely favorable for buyers, but very little consuming interest is in evidence.

Prices at the close on February 24 were:

Spot	Feb. 24	Month Ago	Year Ago
Crepe	7⅞	8½	16⅞
Ribs	7½	8½	16⅜
Upriver fine	12	11¼	17

Rubber in Footwear[1]

G. Dumonthier

THE favor with which rubber footwear is regarded today is justified by the up-to-date methods of manufacture. American manufacturers first succeeded in preparing soling mixings with a suitable rate of cure, good resistance to stretching and stitching, capable of resistance to abrasion and aging, and having a leather-like feel. They arrived at this result by the judicious selection of fillers and accelerator.

The fillers most generally used are zinc oxide, china clays, and carbon blacks. The selection of accelerator is most important for not only must it help to give the qualities mentioned, but it must start the cure rapidly without being violent and give a long flat curve of vulcanization.

Accelerators of the DPG group, which were largely used at first, give a vulcanization with a high modulus, which is very much liked; but their level of vulcanization is very short so that there is risk of overcure just as soon as the optimum temperature and duration is passed.

On the other hand aldehyde amines have the disadvantage of vulcanizing at low modulus. This has led to the manufacture of special accelerators for rubber for footwear derived from aldehyde amines, two of which are accelerators 808 and 833. The chief difference between these two accelerators lies in the coloring of the finished product, accelerator 808 slightly colors the mix; whereas 833 leaves it uncolored. They give to the crude rubber a yielding quality that facilitates milling. They cause a rapid but not violent start in vulcanization and finally insure in the finished product unexcelled resistance to elongation, abrasion, and aging.

Below are a few typical footwear formulæ which show the proportions of fillers, accelerators, etc. It is advisable to add to all these mixings a small amount of Neozone antioxidant, which adds to the durability of the finished product.

WHITE UPPERS

	First Quality	Medium Quality
Pale crepe	38.0	35.0
Ultramarine blue	0.1875	0.125
Zinc oxide	5.0	3.0
Whiting	5.0	20.2625
Lithopone	54.07	40.0
Paraffin	0.25	0.25
Stearic acid	0.25	0.25
Sulphur	1.0	0.9375
Accelerator 833	0.15	0.125
Thionex	0.03	0.025

BLACK UPPERS

	First Quality	Second Quality
Brown crepe	10.0	10.0
Smoked sheet	32.0	32.0
Shoe reclaim	10.0	10.0
Whiting	30.0	30.0
Carbon black	3.0	3.0
Paraffin	0.25	0.25
Stearic acid	0.25	0.25
Neozone C	0.50	0.50
Sulphur	1.20	1.20
Accelerator 808	0.66	1.20
Accelerator 833	0.66	0.275

Vulcanization in air under pressure of about 3 kilos (Kilo = 2.2 pounds). Temperature 120° to 135° C. for 2 to 3 hours.

WHITE SOLES

	Superior Quality
Pale crepe	320.00
Ultramarine blue	1.25
Zinc oxide	150.00
Whiting	151.00
Lithopone	350.00
Vaseline	15.00
Stearic acid	2.50
Sulphur	8.75
Accelerator 833	1.25
Thionex	0.125

Vulcanize in the press at 130° C. in 10 to 20 minutes, according to thickness.

BLACK SOLES

	Good Quality	Cheap Quality
Smoked sheet	320	160
Tire reclaim	160	360
Carbon black	455	425
Zinc oxide	30	25
Stearic acid	7.5	7.5
Neozone A	7.5	5
Accelerator 808	5	4.5
Sulphur	15	13

Vulcanize in a press at 160° C. 12 to 15 minutes.

RED SOLES

	Very Rigid
Pale crepe	330.0
Magnesium carbonate	523.0
Montan mineral wax	30.0
Zinc oxide	15.0
Iron oxide	50.0
Mineral oil	27.0
Stearic acid	3.0
Neozone D	5.0
Accelerator 808	4.4
Sulphur	12.6

Vulcanize in the press at 160° C., 15 to 20 minutes.

[1] "Rubber in the Footwear Industry." G. Dumonthier, *Rev. gén. caoutchouc*, Nov., 1930, pp. 31-32.

Rubber Scrap

THE demand for rubber scrap in February was essentially the same in volume as in January, although prices are pronounced fair. Reclaimers are buying moderately but with no indication of pressing need of stock replenishment in view of the generally quiet trade conditions prevailing in industry. Collections of scrap are poor owing to winter weather conditions and the moderate seasonal demand from reclaimers.

Prices throughout the list are firm and generally unchanged. The price changes are all upward revisions confined to inner tubes and solid truck tires. In all other grades the quotations are unchanged.

BOOTS AND SHOES. A fairly active demand exists for boot and shoe scrap. Collections are slow and will continue so until the mild spring weather arrives. The low price does not permit the expense necessary to make profitable separating colored goods from black; hence, this work is not done by collectors.

Consumers prices are steady at the quoted level of $1.05 to $1.10 a 100 pounds.

INNER TUBES. Collections are none too abundant because of low prices. A fair movement is in progress for domestic consumption. The export demand for No. 1 quality continues fair.

TIRES. Collections are light on pneumatic tires because of winter weather conditions. Prices, however, have remained unchanged and are holding their own.

Solid tires are diminishing in supply month by month, and, as the demand is relatively active, the prices are steadily advancing. The current quotations on clean mixed truck is $28 flat, an increase of $3.50 over that of a month ago. Light gravity grade has moved up from $29—$30 to $33—$35.

MECHANICALS. All grades of mechanical scrap are dull and unchanged. The prices asked are exceptionally low.

HARD RUBBER. Quotations for No. 1 hard rubber scrap are steady at the same price as one month ago.

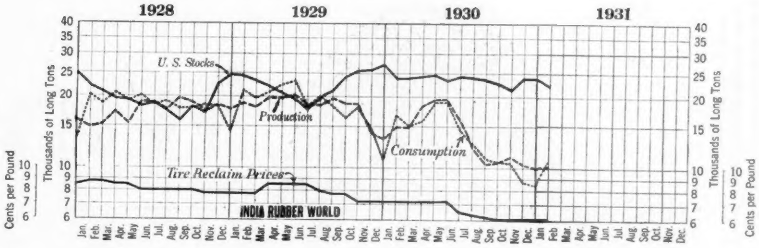
CONSUMERS' BUYING PRICES

Carload Lots

Delivered Eastern Mills

February 24, 1931

		Prices	
Boots and Shoes			
Boots and shoes, black	100 *lb.*	$1.05	@$1.10
Untrimmed arctics	100 *lb.*	.70	@ .80
Tennis shoes and soles	100 *lb.*	.60	@ .70
Inner Tubes			
No. 1, floating	*lb.*	.04¾	@ .05
No. 2 compound	*lb.*	.02⅛	@ .02¼
Red	*lb.*	.02	@ .02⅛
Mixed tubes	*lb.*	.02	@ .02⅛
Tires			
Pneumatic Standard			
Mixed auto tires with beads	*ton*	11.50	@12.00
Beadless	*ton*	16.00	@16.50
Auto tire carcass	*ton*	17.00	@17.50
Black auto peelings	*ton*	20.00	@21.00
Solid			
Clean mixed truck	*ton*	28.00	"flat"
Light gravity	*ton*	33.00	@35.00
Mechanicals			
Mixed black scrap	*lb.*	.00⅝	@ .00¾
Hose, air brake	*ton*	11.00	@13.00
Garden, rubber covered	*lb.*	.00⅜	@ .00½
Steam and water, soft	*lb.*	.00¼	@ .00½
No. 1 red	*lb.*	.01⅞	@ .02⅛
No. 2 red	*lb.*	.01	@ .01⅜
White druggists' sundries	*lb.*	.01⅞	@ .02¼
Mechanical	*lb.*	.01⅛	@ .01¼
Hard Rubber			
No. 1 hard rubber	*lb.*	.08	@ .09



Production, Consumption, Stocks, and Prices of Tire Reclaim

Reclaimed Rubber

THE improved outlook for reclaim that was distinctly evident a month ago continues to hold good. Rubber manufacturers are interested in replenishing their supplies of reclaim while the prices hold at the present record low levels, thus safeguarding against probable rise in price with improved demand.

In recent weeks rubber manufacturers have demonstrated to their satisfaction that despite the close approach of the prices of crude and reclaims, the latter possesses technical advantages over crude from various angles of economy. In certain lines of insulated wire products the ratio of reclaim to crude has been raised very greatly, and the same is true of cheap molded products from many of which crude rubber can be wholly eliminated without impairing their practical service value or aging quality. Typical among such products are mats, matting, and cheap molded specialties in great variety.

The January statistical report on reclaim production, consumption, and stocks issued by the R. M. A. shows essentially the same production as in December. Consumption, however, advanced 2,279 tons over that for December. The net result was to lower January stocks by 1,579 tons to 22,429 tons. The ratio of reclaim to crude rubber consumed, however, dropped 1.7 per cent to 37.6 per cent, essentially the same as last November.

The quotations for standard grade reclaims are unchanged for most of the items listed. The exceptions are in the high tensile listings, where the black quality is reduced ¾-cent a pound, and the red a full cent. The only other exception is white auto tire quality, reduced ¼-cent a pound.

Many unlisted reclaims are available at lower prices. While such reclaims may have some practical value, they unquestionably do not compare in economy or compounding value with those generally accepted as standard grades.

With the exception of the three grades mentioned as having been reduced, the remainder of the list is quoted unchanged. The price levels are so low for standard qualities that rubber manufacturers are planning to take advantage of the unusually favorable opportunities offered.

New York Quotations

February 24, 1931

	Spec. Grav.	Price Per Pound	
High Tensile			
Super-reclaim, black	1.20	$0.07½	@$0.07¾
red	1.20	.07	@ .07¼
Auto Tire			
Black	1.21	.05¾	@ .06
Black selected tires	1.18	.06	@ .06½
Dark gray	1.35	.07	@ .07½
White	1.40	.08	@ .08½
Shoe			
Unwashed	1.60	.06	@ .06¼
Washed	1.50	.07¾	@ .08
Tube			
No. 1	1.00	.08¼	@ .08½
No. 2	1.10	.07¼	@ .07½
Truck Tire			
Truck tire, heavy gravity	1.55	.06	@ .06¼
Truck tire, light gravity	1.40	.06¼	@ .06½
Miscellaneous			
Mechanical blends	1.60	.05	@ .05½

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1929	219,057	224,253	47.9	27,464	12,721
1930	164,917	158,679	41.5	24,008	9,468
1930					
January	15,010	16,785	45.8	24,241	954
February	15,847	14,918	45.5	24,241	1,203
March	17,400	15,616	43.2	24,415	1,048
April	17,828	17,321	43.0	24,592	740
May	17,812	17,473	43.7	23,356	939
June	15,745	14,410	41.6	24,484	641
July	12,320	12,688	42.3	23,870	778
August	10,361	10,999	35.9	23,610	807
September	10,460	10,480	41.4	22,593	656
October	11,298	10,724	39.3	21,729	572
November	10,763	8,816	37.5	24,007	437
December	10,073	8,449	39.3	24,008	693
1931					
January	10,349	10,728	37.6	22,429	649

*Stocks on hand the last of the month or year.

Compiled by The Rubber Manufacturers Association, Inc.

Compounding Ingredients

THE outlook for activity in general rubber compounding ingredients has shown some improvement since the opening of the year. Tire schedules, however, have not been increased as expected, but are seasonally due to be advanced soon for the spring expansion of automobile output and motorists' replacement business.

Footwear production has been unfavorably affected by mild winter weather conditions. In the mechanical and other remaining divisions production has been in moderately increasing volume.

ACCELERATORS. The list of organic accelerators has been increased by the addition of Hydrone, a liquid accelerator particularly adapted for use in latex mixings. The fact that it is fluid permits this accelerator to disperse more easily and completely in a liquid mixing than an accelerator in powdered form. The customary accelerators are in steady demand, with the trend favoring low temperature specialties. T. M. T. T., the new ultra-rapid accelerator, is recommended for insulated wire, tubes, clothing, and bands.

AGE-RESISTERS. Compounders enjoy a liberal choice in the selection of materials for protecting the durability of rubber products whether from oxidation, suncracking, failure from flexing, etc. Each class of age protecting material is well represented in the list, and the materials are well established with compounders.

CARBON BLACK. Consuming demand is slightly improved. Price basis the last week of January for car load lots f.o.b. Texas was 3 cents a pound and in Louisiana 3.1 cents a pound. The middle of February the basis had advanced to 3½ cents f.o.b. Texas and 3.6 cents f.o.b. Louisiana.

CLAY. Clay is being utilized as a cheap filler rather than for its reenforcing quality. In the latter function it is outclassed both in physical effect and volume cost by carbon black.

LITHARGE. The price declined ¼-cent a pound for casks to 7 cents a pound. The demand is slow and seasonal.

LITHOPONE. The demand is seasonal, and price steady and unchanged.

SOFTENERS. Items in this group are always in steady demand for every grade of rubber work. In the case of Degras, improvement in demand is noted.

STABILIZERS. Price of double pressed stearic acid was reduced early in February ½-cent a pound to a 9-cent basis for carload lots of double pressed. A further reduction of ½-cent a pound was reported the middle of February. Demand was fair.

V. M. P. NAPHTHA. Demand is reported slightly improved in February, and the price steady and unchanged.

New York Quotations

February 24, 1931

Prices Not Reported Will Be Supplied on Application

Abrasives				
Marble flour	ton	$20.00	@	$25.00
Pumice stone, pwd.	lb.	.02½	@	.04
Rottenstone, domestic	ton	23.50	@	28.00
Rottenstone, English	lb.	.04	@	.05
Silica	lb.	.01¼	@	.05
Accelerators, Inorganic				
Lead, carbonate	lb.	.07¼	@	
red	lb.	.08	@	
sublimed blue	lb.	.06¾	@	
sublimed white	lb.	.06¾	@	
super-sublimed white	lb.	.06¾	@	
Lime flour, hydrated	ton	20.00	@	35.00
Litharge, casks	lb.	.07	@	
Magnesia, calcined, heavy	lb.	.04	@	
carbonate	lb.	.06	@	.07
Orange mineral A.A.A.	lb.	.10	@	
Accelerators, Organic				
A-1	lb.	.22	@	.27
A-5-10	lb.	.31	@	.36
A-7	lb.	.55	@	.65
A-11	lb.	.62	@	.75
A-16	lb.	.57	@	.65
A-19	lb.	.58	@	.75
A-32	lb.	.70	@	.75
Accelerator 49	lb.	.36	@	.41
Aldehyde ammonia	lb.	.65	@	.70
Altax	lb.		@	
Barak	lb.		@	
B. L. E.	lb.		@	
Butene	lb.		@	
Captax	lb.		@	
Crylene	lb.		@	
paste	lb.		@	
D. B. A.	lb.		@	
Di-esterex N.	lb.		@	
Di-ethyl-amine, 100%	lb.		@	
D. O. T. G.	lb.	.42	@	.44½
D. P. G.	lb.	.30	@	.32½
Ethylidine aniline	lb.	.45	@	.47½
Formaldehyde aniline	lb.	.37½	@	.40
Grasselerator 808	lb.		@	
833	lb.		@	
Heptene	lb.		@	
base	lb.		@	
Hexamethylenetetramine	lb.	.58½	@	.61
Hydrone	lb.		@	
Lead oleate, No. 999	lb.	.14	@	
Witco	lb.	.15	@	
Lithex	lb.		@	
Monex	lb.		@	
Phenex	lb.	.70	@	.75
Pipsol	lb.	4.00	@	4.50
Plastone	lb.		@	
R-2	lb.	1.75	@	2.15
base	lb.	4.50	@	5.00
R & H 40	lb.	.40	@	.42½
50	lb.	.40	@	.42½
397	lb.	.75	@	.77½
Retardex	lb.	.50	@	
Safex	lb.		@	
S-P-D-X	lb.	.70	@	.75
Super-sulphur No. 1	lb.		@	
No. 2	lb.		@	
Tensilac 39	lb.	.40	@	.42½
Thermlo F	lb.		@	
Accelerators, Organic (Continued)				
Thiocarbanilid	lb.	$0.26½	@	$0.28½
Trimene	lb.		@	
base	lb.		@	
Triphenyl guanidine	lb.	.58	@	.60
Tuads	lb.		@	
Ulto	lb.	3.00	@	
Ureka	lb.	.70	@	1.00
Z. B. X.	lb.		@	
Z.88-P	lb.	.50	@	.60
Zimate	lb.		@	
Acids				
Acetic 28% (bbls.)	100 lbs	2.60	@	2.85
glacial (carboys)	100 lbs.	9.73	@	9.98
Sulphuric, 66°	ton	15.50	@	
Alkalies				
Caustic soda, 76% solid	100 lbs.	3.44	@	3.59
Antioxidants				
Age-Rite, powder	lb.		@	
resin	lb.		@	
white	lb.		@	
Albasan	lb.		@	
Antox	lb.		@	
Oxynone	lb.	.68	@	.90
Resistox	lb.	.54	@	.65
Stabilite	lb.	.57	@	.62
Alba	lb.	.70	@	.75
V. G. B.	lb.		@	
Zalba	lb.		@	
Antisun Materials				
Heliozone	lb.		@	
Sunproof	lb.		@	
Binders, Fibrous				
Cotton flock, dark	lb.	.09½	@	.10
dyed	lb.	.50	@	.85
white	lb.	.11½	@	.21
Colors				
BLACK				
Bone	lb.	.07½	@	
Carbon (see Reenforcers)				
Drop (bbls.)	lb.	.05½	@	.15
Lampblack (commercial)	lb.	.07	@	.08
BLUE				
Blue toners	lb.	.60	@	3.85
Prussian	lb.	.35	@	.37
Ultramarine	lb.	.06	@	.30
BROWN				
Iron oxide	lb.		@	
Mapico	lb.	.17	@	
Sienna, Italian, raw	lb.	.05½	@	.12½
GREEN				
Chrome, light	lb.	.27	@	.31
medium	lb.	.28	@	.31
Chromium oxide	lb.	.24	@	.30
Green toners	lb.	1.00	@	3.60
ORANGE				
Cadmium sulphide	lb.	.65	@	.75
Orange toners	lb.	1.40	@	1.60
Colors (Continued)				
ORCHID				
Orchid toners	lb.	$0.05	@	$1.75
PINK				
Pink toners	lb.	1.00	@	1.80
PURPLE				
Purple toners	lb.	.60	@	1.90
RED				
Antimony				
Crimson, R. M. P. No. 3	lb.	.48	@	
Sulphur free	lb.	.52	@	
7-A	lb.	.35	@	
Z-2	lb.	.22	@	
Cadmium	lb.		@	
Iron Oxides				
bright pure domestic	lb.	.10	@	.12
bright pure English	lb.	.11	@	
bright reduced English	lb.	.08	@	
bright reduced domestic	lb.	.04	@	.08
Indian (maroon), pure domestic	lb.	.10	@	
Indian (maroon), pure English	lb.	.09¾	@	
Indian (maroon), reduced English	lb.	.08	@	
Indian (maroon), reduced domestic	lb.	.03	@	.07½
Mapico	lb.	.08¾	@	.11
Oximony	lb.		@	
Red toners	lb.	.95	@	2.75
Rub-er-red	lb.	.08¼	@	
Spanish red oxide	lb.	.02¾	@	.04
Sunburnt red	lb.	.14	@	
Venetian red	lb.	.01½	@	
WHITE				
Lithopone	lb.	.04¾	@	.05
Albalith	lb.	.04½	@	.05
Azolith	lb.	.04½	@	.05
Cryptone	lb.	.06½	@	.07
Grasselli (50 lb. bags)	lb.	.04½	@	.04¾
(400 lb. bbls.)	lb.	.04¾	@	.05
Titanium oxide, pure	lb.	.20	@	
Titanox "B"	lb.	.06½	@	.07
"C"	lb.	.07	@	.07½
Zinc Oxide				
AAA (lead free)	lb.	.06½	@	.07
Azo (factory):				
ZZZ (lead free)	lb.	.06½	@	.07
ZZ (leaded)	lb.	.06¼	@	.06¾
Z (8% leaded)	lb.	.06¼	@	.06¾
Green seal	lb.	.10⅜	@	.10⅞
Green seal, Anaconda	lb.	.10⅜	@	.10⅞
Kadox, black label	lb.	.10⅜	@	.10⅞
blue label	lb.	.09⅜	@	.09⅞
red label	lb.	.08	@	.08½
Red seal	lb.	.09⅜	@	.09⅞
Red seal, Anaconda	lb.	.09⅜	@	.09⅞
Special	lb.	.07	@	.07½
White seal	lb.	.11⅜	@	.11⅞
White seal, Anaconda	lb.	.11⅜	@	.11⅞
XX green	lb.	.07	@	.07½
XX red	lb.	.06½	@	.07
Zinc sulphide	lb.	.15	@	.15¼

New York Quotations

February 24, 1931

Prices Not Reported Will Be Supplied on Application

Colors *(Continued)*

YELLOW

Cadmium sulphide	lb.		@	
Chrome	lb.	$0.16½	@	
Mapico	lb.	.11½	@	
Ochre, domestic	lb.	.01¾	@	.02¾
French	lb.	.03	@	
Oxide, pure	lb.	.09	@	
Zinc, C. P., imported	lb.	.21	@	

Deodorant

Rodo	lb.		@	

Factice—See Rubber Substitutes

Fillers, Inert

Asbestine	ton	13.40	@	13.50
Baryta white (f.o.b. St. Louis, bbls.)	ton	23.00	@	
(f.o.b. St. Louis, paper bags)	ton	22.20	@	
Barytes, white, spot	ton	30.00	@	40.00
off color, spot	ton	20.00	@	25.00
Foam "A" (f.o.b. St. Louis)	ton	23.00	@	
Basofor	lb.		@	
Blanc fixe, dry	lb.	.04½	@	
pulp	ton	42.50	@	45.00
C-C-O white (f.o.b. St. Louis, bbls.)	ton	15.00	@	
Infusorial earth	ton	45.00	@	50.00
Slate flour, gray (fac'y)	ton	6.00	@	
Whiting				
Chalk, imported	100 lbs.	.95	@	1.50
Domestic	100 lbs.	1.00	@	
Paris White, English cliffstone	100 lbs.	1.50	@	3.50
Quaker	ton		@	
Sussex	ton		@	
Witco (l. c. l.) (f.o.b. New York)	ton	20.00	@	
Wood flour	ton	25.00	@	

Fillers for Pliability

Flex	lb.		@	
Fumonex	lb.	.03	@	.08
P-33	lb.		@	
Thermax	lb.		@	
Velvetex	lb.	.02½	@	.06

Finishes

Mica, amber	lb.	.04	@	.05
Shellac, fine orange	lb.	.60	@	
Starch, corn, pwd.	100 lbs.	2.92	@	3.67
potato	lb.	.05½	@	.06
Talc, domestic	lb.	.01¼	@	
dusting	lb.	.01¼	@	.04
French	ton	18.00	@	22.00
Pyrax A	ton		@	

Inflating Material

Ammonium carb., pwd.	lb.	.13	@	.14½
lump	lb.	.12	@	.13½
Sponge paste	lb.	.30	@	

Mineral Rubber

Fluxrite (solid)	lb.		@	
Genasco (fact'y)	ton	40.00	@	42.00
Gilsonite (fact'y)	ton	37.14	@	39.65
Granulated M. R.	ton		@	
Hydrocarbon, hard	ton		@	
Ohmlac Kapak, M. R. (f.o.b. fact'y)	ton	60.00	@	
M. 4 (f.o.b. fact'y)	ton	175.00	@	
Paradura (fact'y)	ton	62.50	@	65.00
Parmr Grade 1	ton	23.00	@	28.00
Grade 2	ton	23.00	@	28.00
Pioneer, M. R., solid (fact'y)	ton	40.00	@	42.00
M. R. granulated	ton	50.00	@	52.00
Robertson, M. R., solid (fact'y)	ton	32.00	@	80.00
M. R. granulated	ton	35.00	@	80.00

Mold Lubricants

Rusco mold paste	lb.	.12	@	.30
Sericite	lb.		@	
Soapbark (cut)	lb.	.08½	@	.09
Soapstone	ton	15.60	@	22.00

Oils

Castor, blown, drums	lb.	.14	@	
Kerosene	gal.	.10	@	
Mineral	gal.	.20	@	
Poppy seed oil	gal.	1.70	@	
Rapeseed	gal.	.71	@	.74
Red oil, distilled	lb.	.08⅜	@	.08⅞
Rubber process	gal.	.25	@	
Spindle	gal.	.30	@	

Protective Colloids

Bentonite (dispersion clay)	lb.	.02½	@	.03
Casein, domestic	lb.	.08½	@	.09½

Reenforcers

Aluminum flake (sacks, c. l.)	ton	$21.85	@	
(sacks, l.c.l.)	ton	24.50	@	
Carbon Black				
Aerfloted arrow	lb.	.03½	@	.07
Cabot certified black	lb.	.03	@	
Century (works, La., c. l.)	100 lbs.	3.50	@	
Disperso (works, La., c. l.)	100 lbs.	3.50	@	
Excello	lb.	.04	@	
Gastex (f. o. b. fact'y)				
contracts	lb.	.03	@	
carload	lb.	.03	@	
less carload	lb.	.04¾	@	.06
Micronex	lb.	.03½	@	.10
Ordinary (compressed or uncompressed)	lb.	.03	@	.08
Palmer gas black	lb.	.03	@	
Supreme	lb.	.04	@	
Clays				
Bento	lb.	.03	@	
Blue Ridge, dark	ton		@	
China	lb.	.01¼	@	
Dixie	ton		@	
Dusto	lb.	.07	@	
Langford	ton		@	
Lexo (works)	ton	8.00	@	
Par	ton		@	
Perfection	ton	20.00	@	
Suprex No. 1	ton	8.00	@	
No. 2, dark	ton	6.50	@	
White, extra light	ton	70.00	@	80.00

Reenforcers *(Continued)*

Glue, high grade	lb.	$0.27	@	$0.35

Rubber Substitutes or Factice

Amberex	lb.	.15	@	
Black	lb.	.07	@	.12
Brown	lb.	.08	@	.13
White	lb.	.09	@	.15

Softeners

Burgundy pitch	100 lbs.	6.00	@	7.00
Atlas	100 lbs.	6.50	@	
Corn oil, crude	lb.	.09	@	
Cottonseed oil (P. S. Y.)	lb.		@	
Cycline oil	lb.	.25	@	.34
Degras	lb.	.04	@	.04½
Fluxol	ton	18.00	@	80.00
Fluxrite (fluid)	lb.		@	
Palm oil (Lagos)	lb.	.05	@	.05½
(Niger)	lb.	.04¾	@	.04⅞
(Witco)	lb.	.05½	@	
Para-flux	gal.	.15	@	.17
Petrolatum, snow white	lb.	.08	@	.08⅜
Pigmentar	gal.	.18	@	.23
Pigmentaroil (tank cars, factory)	gal.	.18	@	
(bbls., drums)	gal.	.23	@	
Pine oil, dest distilled	gal.	.54	@	.55
Pine pitch	bbl.	4.50	@	8.00
Pine tar (retort)	bbl.	12.00	@	
Rosin K (280 lbs.)	bbl.	5.80	@	
Rosin oil, compounded	gal.	.35	@	
No. 3, deodorized	gal.	.57	@	
No. 556, deodorized	gal.	.48	@	
Rubberseed, drums	lb.	.09½	@	.10
Rubtack	lb.	.08	@	
Tackol	lb.	.09	@	.18
Tonox	lb.		@	
Witco No. 20	gal.	.08	@	
Woburn oil	lb.	.05½	@	
Wobonite No. 94	lb.	.03½	@	

Solvents

Benzol (90% drums)	gal.	.25	@	
Carbon bisulphide (drums)	lb.	.05½	@	.12
tetrachloride (drums)	lb.	.06½	@	.07
Dip-Sol	gal.		@	
Dryolene, No. 9	gal.		@	
Gasoline				
No. 303				
Drums, (c. l.)	gal.	.20	@	
Tank cars	gal.	.16	@	
Petrobenzol	gal.		@	
Rub-Sol	gal.		@	
Solvent naphtha (tanks)	gal.	.25	@	
Stod-Sol	gal.		@	
Troluoil	gal.		@	
Turpentine, Venice	lb.	.20	@	
dest distilled	gal.	.35	@	

Stabilizers

Laurex, ton lots	lb.		@	
Sta-Tex A	lb.		@	
Stearates				
Aluminum	lb.	.26	@	.27
Calcium	lb.	.26	@	.27
Magnesium	lb.	.28	@	.29
Zinc	lb.	.27	@	.28
Stearex-B	lb.	.09	@	.14
Stearex flake	lb.	.10	@	.15
Stearic acid, dbl. pres'd	lb.	.09	@	.09½

Vulcanizing Ingredients

Sulphur				
Rubber sulphur	100 lbs.	1.75	@	2.25
Soft rubber (c.l.)	100 lbs.		@	
(l.c.l.)	100 lbs.		@	
Sulphur chloride	lb.	.03½	@	.04
Superfine commercial flour (bbls.)	100 lbs.	2.55	@	3.10
(bags)	100 lbs.	2.20	@	2.80
Tire brand, superfine	100 lbs.	1.75	@	
Tube brand, velvet	100 lbs.	2.30	@	
Velvet flour (240 lb. bbls.)	100 lbs.	2.95	@	3.50
(150 lb. bags)	100 lbs.	2.60	@	3.15
Telloy	lb.		@	
Vandex	lb.		@	
(See also Colors—Antimony)				

Waxes

Beeswax, white, com.	lb.	.55	@	
carnauba	lb.	.33	@	
ceresin, white	lb.	.12½	@	
montan	lb.	.06½	@	
ozokerite, black	lb.	.28	@	
green	lb.	.28	@	
Paraffin				
122/124, crude, white scale	lb.	.03¼	@	
124/126 crude, white scale	lb.	.03¼	@	
125/127 fully refined	lb.	.04¼	@	

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Commodity	City and Country
*49,499	Scrap rubber	Barcelona, Spain
*49,511	Boats and balloons for aeronautical purposes	Belgrade, Yugoslavia
*49,542	Plates	Erzgebirge, Germany
†49,556	Druggists' sundries	Bombay, India
†49,583	Specialties	Amsterdam, Netherlands
‡49,626	Battery jars	Brussels, Belgium
†49,677	Shoes, boots, soles, and heels	Bogota, Colombia
*49,713	Mackintoshes and tubing	Cairo, Egypt
†49,716	Sport goods	La Paz, Bolivia
†49,749	Flooring	Copenhagen, Denmark
†49,764	Hose	Milan, Italy
*49,803	Old tires	Hong Kong, China
*49,821	Crude and vulcanized rubber	Hronov, Czechoslovakia
†49,822	Packings	Hamburg, Germany
*49,823	Red rubber and automotive accessories	Offenbach, Germany
†49,824	Footwear	Herisau, Switzerland
*†49,827	Sport goods	Nairobi, British East Africa
†49,828	Sport goods	Vienna, Austria
†49,862	Toys	Amsterdam, Netherlands
†49.883	Toys and specialties	Mexico City, Mexico
†49,921	Tires	Zagreb, Yugoslavia
*49,959	Footwear, flooring, and garden hose	Liverpool, England
*49,960	Phonograph industry supplies	Bombay, India
†49,990	Rubber goods	Guayaquil, Ecuador
†50,009	Ebonite	Sao Paulo, Brazil
†50,023	Sundries and specialties	London, Canada
†50.052	Hard, pharmaceutical, dental, and medical goods; rubberized fabrics; and reclaimed rubber	Paris, France
†50.071	Rubberized fabrics	Montreal, Canada
†50,072	Tires and inner tubes	Copenhagen, Denmark
†50,073	Belting	Harnosand, Sweden

*Purchase. †Agency. *†Purchase and agency. ‡Either.

Cotton and Fabrics

THE statistical position of cotton in the last month has not warranted the extended rise that occurred. For that reason some skepticism exists as to whether the better prices can be maintained.

Lower exports, large quantities of cotton on hand, and unfavorable reports in respect to acreage reduction were the bearish factors in the situation.

The settlement of the Lancashire dispute, the possibility that the embargo on British goods may be lifted in India, and better activity at the mills were the bullish factors.

The better demand for cloth was probably the direct reason for the rise. The cotton market is displaying almost the same tendencies that the stock market developed in the second half of February. Nothing definite appears on the financial horizon. "But an indefinable sense of a slowly changing attitude seemed to pervade the markets and to direct their course, whenever they moved at all." It appears that "psychological" markets are again returning, but this time on the side of the bulls.

If support is given the market, it will probably come from mill statistics. For each of the weeks of February, spinners have taken more yarn, and the sale of cotton cloths has been reported as strong and active.

Opinions as to the size of the acreage reduction are rather vague and will continue so until planting is begun on a wider scale. The drought during the Summer was said to have reduced the boll weevil menace, but the drought during the Winter was said to have preserved any bolls that were carried over; so the net change in the pest may be small.

With the resignation of Chairman Legge from the Federal Farm Board, and with opposition being registered to the appropriation of the remaining $100,000,000 of the half billion first allotted, the market next year may suffer less from the activities of this board.

Week ended January 31. While the gains in the price of cotton for the week were small, the amount of trade buying which sustained the slight bulge was encouraging. At the close of the week prices were firm, with the increased takings by spinners and greater mill activity cheerful factors.

The weekly figures of the New York Cotton Exchange showed that 223,000 bales of cotton were forwarded to the world's mills for the week compared with 164,000 bales the previous week and 266,000 last year.

It was also reported that world's consumption of American lint cotton for December totaled approximately 915,000 bales compared with 942,000 in November and 1,041,000 in December last season. Comparison with the previous season's figures in this month was much more favorable than that with other months of the past year. Many, consequently, were led to believe that consumption figures for the last six months of the present season will not compare unfavorably with those of the year before.

COTTON BULL POINTS

1. **Lancashire dispute is settled.**
2. **Standard cloth statistics for January showed a decrease of 2.13 per cent in stocks on hand for the month; an increase of 9.9 per cent in unfilled orders; sales were equal to 118.3 per cent of production; and shipments were 104.2 per cent of production.**
3. **It seems possible that the troubles in India will be settled, and the embargo on British cloth lifted.**
4. **Final estimate for Indian cotton is 4,836,000 bales, several hundred thousand bales below totals for last year.**
5. **Increased activities are expected by spinners in Japan.**

COTTON BEAR POINTS

1. **World's visible supply of cotton of all kinds on February 21 was 9,950.300 bales, against 7,966,066 a year ago.**
2. **Reports of progress in the acreage reduction campaign do not seem to be very encouraging. Estimates range from 5 to 10 per cent.**
3. **Cotton consumption during January was 454,188 bales, compared with 576,160 in January, 1930.**
4. **Exports during January totaled 624,631 bales of lint, compared with 765,835 in December and 728,737 in January of last year.**
5. **Cotton spindles active in January totaled 25,611,458, compared with 25,525,820 in December, and 29,177,228 in last January.**

Negotiations were reported to be under way in an effort to settle the dispute in the Lancashire section, but later it was said the conferences had broken up. The market was firm under the news. The strike in our own country at Danville ended this week; the workers went back to their jobs after many months of idleness. It was reported that mill owners had not conceded to the demands of the union and that employes returned to work on the same terms they had when they left.

Cotton shippers took a definite stand against the Farm Board during the week when a representative group of the American Cotton Shippers' Association appeared before the Senate Appropriations Committee asking that further appropriations be denied to the Farm Board, that a Congressional inquiry be inaugurated, and that the agricultural marketing act which created the board be repealed.

Prices at the close of January 31 were:

Position	High	Low	Close	Previous Close
Mar.	10.44	10.34	10.36	10.40/44
May	10.71	10.61	10.64	10.68/69
July	10.94	10.86	10.88/89	10.92/94
Oct.	11.24	11.14	11.15/16	11.20/21
Dec.	11.42	11.32	11.36/37	11.38/39

Week ended February 7. A strong mill demand lifted cotton prices to a level about 20 points higher at the close than they were at the beginning of the week. Firmer prices attracted offerings from the South and sent the market a few points off at times, but usually it was strong enough to come back.

The goods trade early reported that business had been better than at any time since last October. Farmers were said to be delaying planting operations until relief was given to those who suffered from the drought.

In a speech before the Southern Agricultural Workers' Association, Secretary Hyde urged the southern farmers to cut the cotton crop. "Overproduction is our fundamental problem," he said. "Other problems are incidental, are only symptoms of the real disease. It is time we threw away poultices and plasters, which merely assuage the symptoms, and begin to deal seriously with the disease. . . .

"If we will work with the economic law," Secretary Hyde continued, "by regulating production of farm products to the limits of market demands, the law will work with us. What the nation needs is not more crops, but more prosperous farmers."

In response to the opposition accorded the proposal to increase the appropriation given to the Federal Farm Board, Chairman Alexander Legge offered to discuss with cotton men the disposition of the 1,300,000 bales of the 1929 crop now held by the Cotton Stabilization Corp. Cotton men have asserted that doubt as to the disposition of this large stock of cotton was detrimental to their interests, and if the board is given the $100,000,000 in 1932, which still remains of the original $500,000,000 appropriated, the continued operations of this government agency would retard the natural economic recovery of the industry.

Prices at the close of February 7 were:

Position	High	Low	Close	Previous Close
Mar.	10.70	10.61	10.61/63	10.65/67
May	10.98	10.86	10.88/89	10.91/92
July	11.21	11.11	11.12	11.16/17
Oct.	11.49	11.37	11.37/38	11.44
Dec.	11.68	11.55	11.55/57	11.64/65
Jan.	11.77	11.62	11.62/63	11.71

Week ended February 14. The action of the cotton and stock markets was front-page news during this week, the first time in a long period. Changes for the week sent cotton 30 and more points higher than at the close of the previous week.

No definite reason could be given for the sudden rise in stocks and grain, but the bears were certainly sent scurrying for cover. A good deal of cotton was offered on the rises, of course, but on the whole the market acted well and absorbed all offerings. Heavy offerings failed to stop the forward march for three or four days. At the close of the week prices reacted slightly, but the substantial gains mentioned above were the net result.

May contracts hit 11¼ cents at one time, or 145 points above the low point of the season. The January, 1932, delivery reached 12.31 cents on Friday, but slid back to close the week at 11.92 cents.

Standard cloth statistics for January reflected a stronger position, with sales exceeding production by 18.3 per cent. Stocks on hand decreased 2.3 per cent; while unfilled orders increased 9.9 per cent.

Following Chancellor Philip Snowden's speech, in which he warned his countrymen in England that rigid economy was necessary, the Cotton Spinners' and Manufacturers' Association held an unexpected meeting at which they decided to withdraw their lockout, discontinue the more-looms-per-weaver experiment at Burnley, and open their mills on Monday.

John F. Grey, chairman of the central committee, issued a statement in which he said, in part: "We consider it our obligation to take a wise industrial and national view of the situation. We have been fur-

ther impressed by the very grave warning about the condition of industry and finance in this country given by Philip Snowden . . ."

A cotton exhibition was also held in London the next week, and the owners felt their lockout policy was inconsistent with this effort to increase sales.

Prices at the close of February 14 were:

Position	High	Low	Close	Previous Close
Feb.	....	....	10.75	11.78
Mar.	10.98	10.87	10.87	10.90/92
Apr.	11.00	11.00	10.99	11.04
May	11.23	11.12	11.12/13	11.18/19
June	....	....	11.24	11.30
July	11.48	11.37	11.37/39	11.43/45
Aug.	....	....	11.52	11.56
Sept.	....	....	11.54	11.59
Oct.	11.72	11.64	11.64/65	11.69
Nov.	....	....	11.74	11.79
Dec.	11.91	11.85	11.85	11.90
Jan.	11.99	11.92	11.92	12.00

Week ended February 21. The rally which began last week was continued through the first half of this week, but the higher prices attracted large offerings from the South, which turned the market reactionary.

Before the reaction set in, prices had climbed to levels which established highs for the season. March was as high as 11.16 cents before it sold off, and the May delivery went to 11.52 cents, more than $8 a bale over the season's low records.

Support for the strong movement came from the Continent, from Japanese interests, and from the hope that matters would be soon straightened out in India. The settlement of the labor dispute in Lancashire, coincident with the first national cotton textile exhibition ever held in Britain, was responsible for a stronger tone in the cables that came from Liverpool. The strength in the local stock market was also a contributing factor, probably accounting for the rally on Saturday, after the slight reaction on the previous two days. The net change for the week was a gain of about 10 to 20 points.

The Indian Government estimated acreage this year at 23,531,000 and the yield

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Jan. 31	10.44
Feb. 7	10.64
Feb. 14	10.91
Feb. 21	11.08

at 4,836,000 bales, several hundred thousand below last year. Buying of cotton cloths by India was freer, and inquiry for cotton yarns was fair. Domestic mills were also reported as buying heavily.

Following the announcement by Chairman Legge that he would resign from the Farm Board after Congress adjourns on March 4, another member of the board, Samuel R. McKelvie, former governor of Nebraska, the wheat member of the board, also announced his retirement, effective June 15. Mr. Legge's reason for resigning was said to be the adverse criticism which had been directed at the work of the board.

Prices at the close of February 21 were:

Position	High	Low	Close	Previous Close
Mar.	10.97	10.86	10.94/97	10.92
Apr.	....	....	11.08	11.06
May	11.25	11.15	11.23/25	11.21
June	....	....	11.35	11.33
July	11.49	11.40	11.47/49	11.46
Aug.	11.53	11.53	11.59	11.60
Sept.	....	....	11.65	11.64
Oct.	11.75	11.66	11.75	11.74
Nov.	....	....	11.84	11.83
Dec.	11.94	11.85	11.94	11.92
Jan.	12.04	11.93	12.04	12.01

On February 24 after the two-day interval occasioned by the celebration of Washington's birthday, the New York market was steady at 30 points advance, with spot middlings at 11.35 cents.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. The demand for these goods has improved. The outlook indicates firmer prices and generally improved trade prospects. Although the mills have generally and sharply curtailed production, the supply of goods is adequate to meet the expected spring demand. Prices are practically unchanged.

RAINCOAT FABRICS. The raincoat business is very quiet. Rubberizers are only buying sample yardage to make up their new spring models. The demand for fabrics, however, is expected to begin actively within the next thirty days.

SHEETINGS. During practically all of February the market was active and advancing, with the volume of business very large. This activity is expected to continue at least to the middle of March, and prices are expected to rise meantime.

TIRE FABRICS. The market throughout February was quiet, with light scattering demand confined mostly to American cotton. Very little demand arose for Egyptian grades. Prices held steady and unchanged.

Early Experimenters Originated The Term "Cure"

It is claimed that the rubber industry term "cure" originated with early experimenters seeking for a substance or process which might not only preserve crude rubber but make it serviceable at all temperatures.

Doubtless some believed that rubber, even though already coagulated by smoke, could be still further fumed or even salted, as in the curing of meat or fish, to get the desired properties. Even after Goodyear had vulcanized rubber with sulphur in a hot, and Parkes in a cold process, the use of the term "cure" to obtain such a result long persisted; in fact, it is still common.

The tendency now, however, is to use the term "cure" not so much in describing the actual physical change wrought in rubber by those processes as in indicating the time and temperature required to bring about the sought-for vulcanization—or not so much the end as the means to the end.

New York Quotations

February 24, 1931

Drills

38-inch 2.00-yard	*yard*	$0.11½ @
40-inch 3.47-yard		.06⅞ @
50-inch 1.52-yard		.15⅛ @
52-inch 1.90-yard		.12⅜ @
52-inch 2.20-yard		.10⅞ @
52-inch 1.85-yard		.12¾ @

Ducks

38-inch 2.00-yd D. F.	*yard*	.11⅝ @
40-inch 1.45-yard S. F.		.15½ @
72-inch 1.05-yard D. F.		.24¼ @
72-inch 16.66-ounce		.25½ @
72-inch 17.21-ounce		.26⅜ @
MECHANICAL		
Hose and belting	*pound*	.24 @
TENNIS		
52-inch 1.35 yard	*yard*	.17¾ @

Hollands

RED SEAL		
36-inch	*yard*	.12¾ @
40-inch		.13¾ @
50-inch		.19¼ @
GOLD SEAL		
40-inch, No. 72	*yard*	.16¼ @
40-inch, No. 80		.17¾ @

Osnaburgs

40-inch 2.35-yard	*yard*	$0.10 @
40-inch 2.48-yard		.09½ @
40-inch 3.00-yard		.07⅞ @
40-inch 10-oz. part waste		.11 @
40-inch 7-oz. part waste		.07½ @
37-inch 2.42-yard		.09½ @

Raincoat Fabrics

COTTON		
Bombazine 64 x 60	*yard*	.09¾ @
Bombazine 60 x 48		.08¾ @
Plaids 60 x 48		.10½ @
Plaids 48 x 48		.11½ @
Surface prints 64 x 60		.11¾ @
Surface prints 60 x 48		.10¾ @
Print cloth, 38½-in., 60 x 48		.04¾ @
Print cloth, 38½-in., 64 x 60		.05¼ @

Sheetings, 40-inch

48 x 48, 2.50-yard	*yard*	.07¾ @
48 x 48, 2.85-yard		.06¼ @
64 x 68, 3.15-yard		.07¾ @
56 x 60, 3.60-yard		.06½ @
44 x 48, 3.75-yard		.05¼ @
44 x 40, 4.25-yard		.05¼ @

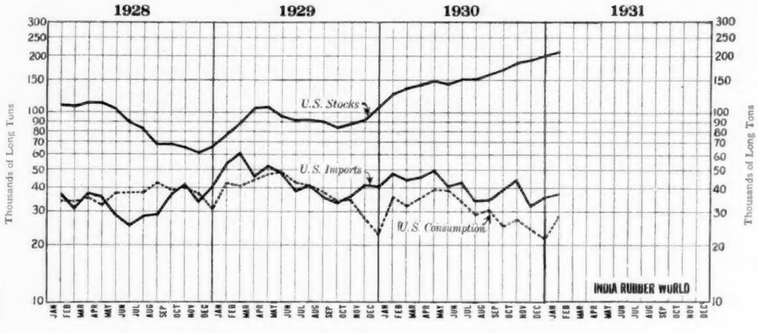
Sheeting, 36-inch

48 x 48, 5.00-yard	*yard*	.04⅝ @
40 x 40, 6.15-yard		.03⅞ @

Tire Fabrics

SQUARE WOVEN 17¼-ounce		
Peeler, karded	*pound*	$0.30 @
BUILDER 23/11		
Peeler, karded	*pound*	.30 @
BUILDER 10/5		
Peeler, karded	*pound*	.24 @
CORD 23/5/3		
Peeler, karded	*pound*	.30 @
CORD 23/4/3		
Peeler, karded	*pound*	.32 @
CORD 23/3/3		
Peeler, karded	*pound*	.35 @
CORD 15/3/5		
Peeler, karded	*pound*	.28 @
CORD 13/3/3		
Peeler, karded	*pound*	.27 @
LENO BREAKER		
8-oz. Peeler, karded	*pound*	.30 @
10-oz. Peeler, karded		.30 @
CHAFER		
9.5 oz. Peeler, karded	*pound*	.32 @
12-oz. Peeler, karded		.31 @
14-oz. Peeler, karded		.30 @

Imports, Consumption, and Stocks



United States Stocks, Imports, and Consumption

NET imports of rubber into the United States during January totaled 37,098 long tons, as compared with 34,895 tons in December, an increase of 2,203 tons. Consumption for January made a still greater increase over that for December; the figures are January, 28,557 tons, and December, 21,493 tons. Stocks afloat in January were 56,188 tons. This tonnage is practically the same as in December. The domestic consumption of rubber in February will probably fall short considerably from that in January because of its fewer working days and two holidays besides.

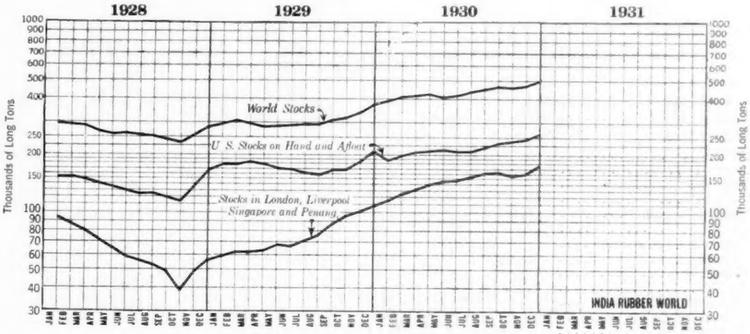
On December 31, 1930, world's production (exports) reached the impressive total of 815,835 long tons; world's consumption, 702,935 long tons; and world's stocks, 492,165 long tons.

Fluctuations in Stocks

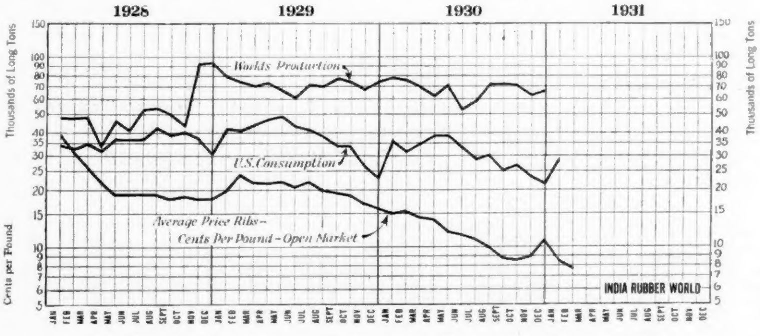
Under normal conditions of production, stocks of crude rubber in producing countries and quantities afloat represent mainly working stocks, and are not likely to show much fluctuation beyond that due to seasonal variations in output. The only important stocks in manufacturing countries are those in public warehouses in London and Liverpool and the United States.

The stocks in the hands of manufacturers in the United States have usually been between 60 and 80 per cent of the total United States stocks. The stocks in London and Liverpool are the main reserves of immediately available rubber, and have accordingly recorded large fluctuations during the last twenty years.

The total world stocks declared and undeclared at any time must be considered in relation to the monthly world absorption at that time, and the ratio of the former to the latter has varied from 5½ to 11 during the past two years, and has shown even greater fluctuation in the past. A total world stock equivalent to about six months' absorption is usually regarded as necessary for smooth working of the industry.



World, United States, London, Liverpool, Singapore, and Penang Stocks



World's Production, U. S. Consumption, and Price of Ribs

London and Liverpool Stocks

London, Liverpool, Singapore, and Penang stocks of December 31, 1930, were 166,578 long tons.

LONDON STOCKS

Week Ended	Tons
Jan. 31	81,039
Feb. 7	81,163
Feb. 14	81,432
Feb. 21	82,111

LIVERPOOL STOCKS

Week Ended	Tons
Jan. 31	43,463
Feb. 7	43,293
Feb. 14	43,679
Feb. 21	44,555

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Net Imports* Tons	U. S. Consumption Tons	U. S. Stocks on Hand§ Tons	U. S. Stocks Afloat§ Tons	London and Liverpool Stocks§ Tons	Singapore and Penang Stocks§ Tons	World Production (Net Exports) Tons	World Consumption† Tons	World Stocks‡§ Tons
1925	384,837	384,644	50,985	52,421	6,328	18,840	527,600	553,300	180,850
1926	411,962	358,415	72,510	51,238	51,320	26,443	621,900	542,000	273,060
1927	431,807	372,528	100,130	47,938	66,261	25,798	607,300	593,866	298,780
1928	446,421	442,227	66,166	68,764	22,603	32,905	653,837	686,945	284,198
1929	561,454	466,475	105,138	62,389	73,253	35,548	860,404	804,820	371,425
1930	498,343	372,629	202,246	56,035	120,575	46,003	815,835	702,935	492,165
1931									
January	37,098	28,557	209,487	56,188	124,456	49,802	......	......	......

* Including liquid latex, but not guayule.
† Comprises U. S. consumption, United Kingdom absorption, and net imports for other countries.
‡ Includes stocks afloat but not in Colombo, Amazon Ports, Amsterdam, and Paris.
§ Stocks on hand the last of the month or year.

World Rubber Shipments—Net Exports

Long Tons

British Malaya	Calendar Years 1928	Calendar Years 1929	1930 Sept.	1930 Oct.	1930 Nov.	1930 Dec.
Gross Exports	409,500	579,524	48,529	47,770	41,281	42,086
Imports	149,787	161,612	8,087	7,312	7,774	9,671
Net	259,713	417,912	40,442	40,458	33,507	32,415
Ceylon	57,271	80,795	7,966	7,681	6,042	6,934
India and Burma	10,790	11,720	343	591	864	1,049
Sarawak	10,087	11,079	680	598	631	976
British No. Borneo	6,698	7,381	600	650	*600	*600
Siam	4,813	5,024	289	300	311	335
Java and Madura	58,848	66,010	5,960	5,916	5,334	6,254
Sumatra E. Coast	82,511	87,589	6,358	6,956	6,401	7,196
Other N. E. Indies	121,671	134,732	7,302	6,352	8,001	8,476
French Indo-China	9,616	10,147	648	854	654	721
Amazon Valley	21,129	21,148	1,093	669	658	1,365
Other America	1,490	996	48	....	9	85
Guayule	3,076	1,275	100	64	....	....
Africa	6,124	4,596	283	336	178	135
Totals	653,837	860,404	72,112	71,425	63,190	66,541

* Estimate. *Compiled by Rubber Division, Department of Commerce, Washington, D. C.*

World Rubber Absorption—Net Imports

Long Tons

	Calendar Years 1928	Calendar Years 1929	1930 Sept.	1930 Oct.	1930 Nov.	1930 Dec.
CONSUMPTION						
United States	441,400	472,000	25,371	27,360	23,556	21,564
United Kingdom	48,504	72,023	8,570	10,647	360	10,292
NET IMPORTS						
Australia	8,430	15,886	414	609	464	*500
Austria	3,043	3,324	158	74	37	113
Belgium	7,958	9,445	824	769	596	*600
Canada	30,447	35,453	1,578	1,942	2,128	1,347
Czechoslovakia	3,138	4,650	411	351	343	*350
Denmark	566	799	113	109	83	101
Finland	768	976	139	109	209	130
France	36,498	59,342	5,285	7,403	13,662	*6,000
Germany	37,855	49,078	4,089	3,747	3,074	3,105
Italy	12,433	17,169	1,244	2,460	2,538	2,815
Japan	25,621	34,284	2,606	3,951	4,003	4,104
Netherlands	2,243	3,022	221	439	364	205
Norway	728	813	73	299	125	107
Russia	15,134	12,626	1,373	2,773	2,140	*1,500
Spain	2,000	2,400	*200	*200	*200	*200
Sweden	2,356	3,857	492	615	763	309
Switzerland	566	653	87	65	61	56
Others estimated†	8,000	7,000	*600	*600	*600	*600
Totals	687,688	804,800	53,848	64,522	55,306	53,998
Minus United States	441,400	472,000	25,371	27,360	23,556	21,564
Total foreign	246,288	332,800	28,477	37,162	31,750	32,434

* Estimate to complete table. † Includes Argentina, Brazil, Chile, China, Cuba, Egypt, Estonia, Hungary, Latvia, Mexico, Poland, Portugal, and Union of South Africa.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for January, 1931:

Rubber Exports

Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham.

January, 1931

To	Sheet & Crepe Rubber Tons	Latex Concentrated Latex & Revertex Tons
United Kingdom	8,403	15
United States	23,852	61
Continent of Europe	5,043	24
British possessions	544	..
Japan	2,658	1
Other countries	978	..
Totals	41,478	101

Rubber Imports

Actual Imports by Land and Sea.

January, 1931

From	Dry Rubber Tons	Wet Rubber Tons
Sumatra	454	5,136
Dutch Borneo	385	2,733
Java and other Dutch Islands	33	20
Sarawak	746	24
British Borneo	195	24
Burma	266	13
Siam	246	178
French Indo-China	468	21
Other countries	78	9
Totals	2,871	8,158

Low and High New York Spot Prices

PLANTATIONS	February 1931*	February 1930	February 1929
Thin latex crepe	$0.07⅝ @ $0.08¼	$0.15⅝ @ $0.16⅞	$0.22 @ $0.27⅜
Smoked sheet, ribbed	.07⅜ @ .08	.15 @ .16⅜	.21¾ @ .26⅞
PARAS			
Upriver fine	.07¼ @ .10¾	.16¼ @ .17	.23½ @ .27¼
Upriver coarse	.07 @ .08	.08¼ @ .08¾	.14¾ @ .17¾
Upper caucho ball	.07 @ .08	.08¼ @ .08¾	.14 @ .17¼

*Figured to February 24, 1931.

Dutch Estate Rubber Production

"Declared" and "corrected" statistics of Dutch monthly estate production for 1929 and 1930 are forwarded by Trade Commissioner Don C. Bliss as follows (metric tons):

	Declared 1929	Declared 1930	Corrected 1929	Corrected 1930
Jan.	13,024	13,770	13,380	14,146
Feb.	12,579	12,244	12,922	12,577
Mar.	9,221	12,182	9,473	12,515
Apr.	12,894	12,541	13,246	12,884
May	12,667	3,536	13,013	3,633
June	13,061	14,154	13,418	14,540
July	13,051	14,912	13,407	15,319
Aug.	11,395	11,831	11,706	12,154
Sept.	12,150	13,190	12,482	13,550
Oct.	12,587	14,307	12,931	14,698
Total	122,629	122,667	125,978	126,016
Year	150,051	......	154,154	......

The *Korte Berichten* estimate of 1930 output still stands at 149,414 metric tons; but if corrected production continues at the recent rate, the total will eventually reach 154,000 metric tons or more, as in 1929.

Principal Rubber Stocks

Long Tons

	1930 July	Aug.	Sept.	Oct.	Nov.	Dec.
Malay Estates	25,814	26,430	26,573	25,663	26,028	25,837
S. S. Dealers	38,537	41,513	36,618	34,479	36,884	39,610
Other Malay Dealers	12,498	13,052	13,290	12,924	14,523	15,982
Malayan Ports	5,998	5,877	6,830	4,734	4,016	5,569
Totals	82,847	86.872	83,311	77,800	81,451	86,098
London	81,048	80,931	83,329	77,647	76,887	77,462
Liverpool	28,291	29,670	34,718	38,848	39,718	41,190
Totals	109,339	110,601	118,047	116,495	116,605	118,562
U. S. Inventory	158,445	162,283	171,285	188,310	193,091	206,829
U. S. Afloat	58,989	62,149	64,000	†50,441	†51,837	†55,288
Europe Afloat	27,290	30,310	31,000	27,630	24,220	*25,000
Totals	86,279	92,459	95,000	78,071	76,057	80,288
Grand totals	436,910	452,215	467,643	460,676	467,204	491,777

* Provisional figure subject to revision.

† Rubber Manufacturers Association, Inc., figure, raised from estimated 75 per cent to 100 per cent.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Ceylon Rubber Exports

January 1 to November 30, 1930

To	Tons
United Kingdom	15,975.04
Continent	8,616.02
Other countries in Europe	74.39
Australia	1,220.97
America	43,186.17
Canada and Newfoundland	2.50
Other countries in America	251.13
Egypt	11.00
Africa	12.46
India	84.74
China	.90
Japan	270.31
Other countries in Asia	3.29
Total	69,708.92
For the same period last year	72,050.91

Annual Exports, 1922-1929

	Tons
For the year 1929	80,219.25
1928	57,825.48
1927	55,355.77
1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88
1922	47,367.14

Strong Rubber Adhesive

An adhesive much used in British rubber footwear making is said to be composed of crude rubber, 75 parts; balata or gutta percha, 25 parts; carbon tetrachloride, 100 parts; and enough naphtha to give desired consistency.

United States Statistics

Imports of Crude and Manufactured Rubber

	November, 1930		Eleven Months Ended November, 1930	
Unmanufactured—*Free*	Pounds	Value	Pounds	Value
Crude rubber	65,859,117	$5,700,086	995,826,659	$131,892,466
Liquid latex	743,169	65,265	10,272,313	1,550,858
Jelutong or pontianak	871,901	84,219	12,270,604	1,286,600
Balata	163,181	61,650	922,478	356,486
Gutta percha	22,516	2,087	135,726	21,918
Guayule	......	......	2,455,427	347,388
Siak, scrap and reclaimed	861,570	6,673	10,027,377	129,628
Totals	68,521,454	$5,919,980	1,031,910,584	$135,585,344
Chicle ....*Dutiable*	......	......	*8,733,245	*$4,470,252
Chicle, crude ....*Free*	1,015,480	$518,010	†4,269,446	†$2,076,041
Manufactured—*Dutiable*				
Tires ....*number*	1,063	$5,920	6,914	$80,601
Other rubber manufactures	......	89,730	......	1,134,040
Totals	......	$95,650	......	$1,214,641

Exports of Foreign Merchandise

	Pounds	Value	Pounds	Value
Rubber and Manufactures				
Crude rubber	2,912,081	$271,348	62,804,479	$8,774,008
Balata	41,491	10,121	1,173,470	255,409
Gutta percha, rubber substitutes, and scrap	8,966	829	61,386	7,779
Rubber manufactures	......	482	......	150,651
Totals	......	$282,780	......	$9,187,847

Exports of Domestic Merchandise

	Pounds	Value	Pounds	Value
Rubber and Manufactures				
Reclaimed	979,292	$54,946	19,662,096	$1,151,237
Scrap and old	5,408,771	131,665	47,928,428	1,629,496
Rubberized automobile cloth ....*sq. yd.*	75,470	36,804	1,141,610	554,320
Other rubberized piece goods and hospital sheeting *sq. yd.*	109,277	53,225	1,241,724	542,611
Footwear				
Boots ....*pairs*	108,695	232,358	905,669	1,928,751
Shoes ....*pairs*	122,106	156,931	2,055,372	2,384,096
Canvas shoes with rubber soles ....*pairs*	173,192	114,238	3,766,983	2,466,056
Soles ....*doz. pairs*	10,868	33,687	124,165	357,281
Heels ....*doz. pairs*	96,219	65,635	1,111,079	766,961
Water bottles and fountain syringes ....*number*	38,673	15,381	439,054	224,495
Gloves ....*doz. pairs*	9,639	23,095	110,549	280,454
Other druggists' sundries	......	29,372	......	314,990
Balloons ....*gross*	90,541	89,096	673,085	701,883
Toys and balls	......	15,906	......	128,768
Bathing caps ....*doz.*	2,923	5,148	157,872	337,748
Bands	35,981	15,744	544,054	247,263
Erasers	41,356	24,684	472,123	285,533
Hard rubber goods				
Electrical goods	90,131	10,702	1,180,400	164,225
Other goods	......	37,533	......	342,439
Tires				
Truck and bus casings, *number*	35,369	768,975	417,918	9,338,663
Other automobile casings, *number*	147,877	1,334,329	1,897,590	16,485,582
Tubes, auto ....*number*	100,923	178,250	1,497,013	2,525,564
Other casings and tubes, *number*	14,681	17,505	87,403	232,138
Solid tires for automobiles and motor trucks *number*	1,209	50,092	23,376	743,770
Other solid tires	112,420	18,637	1,349,433	229,166
Tire accessories	......	90,015	......	1,210,660
Rubber and friction tape	155,386	48,327	1,418,904	391,529
Belting	276,838	141,120	4,007,404	2,047,269
Hose	413,441	142,772	6,933,200	2,327,812
Packing	129,612	57,970	1,834,973	817,574
Thread	81,700	81,669	1,484,312	1,464,311
Other rubber manufactures	......	171,093	......	2,422,577
Totals	......	$4,246,904	......	$55,045,222

* Ending June 17, 1930. † Beginning June 18, 1930.

Crude Rubber Imports by Customs Districts

Including latex, dry rubber content

	December, 1930		December, 1929	
	Pounds	Value	Pounds	Value
Massachusetts	3,384,675	$268,907	3,250,694	$552,509
New York	70,972,278	6,151,722	86,236,002	15,809,240
Philadelphia	....	....	1,090,831	221,429
Maryland	2,121,447	138,269	103,018	18,837
Georgia	1,120,000	68,299	......	......
Los Angeles	5,398,525	504,577	4,732,875	855,587
San Francisco	446,043	46,436	163,882	28,422
Oregon	11,200	1,037	......	......
Ohio	254,044	17,176	1,262,666	219,571
Totals	83,708,212	$7,196,423	96,839,968	$17,705,595

United Kingdom Statistics

Imports

	December, 1930		Twelve Months Ended December, 1930	
Unmanufactured Crude rubber From—	Pounds	Value	Pounds	Value
Straits Settlements	16,184,500	£308,116	185,285,200	£4,839,659
Federated Malay States	6,192,000	118,065	79,885,200	2,097,537
British India	1,370,200	26,210	14,057,200	383,656
Ceylon and Dependencies	3,202,900	57,401	37,699,300	947,507
Java and Dutch Borneo	2,852,300	54,209	35,949,200	947,849
Sumatra and other Dutch possessions in Indian Seas	1,907,200	36,848	23,760,800	650,114
Other countries in East Indies and Pacific not elsewhere specified	445,300	8,531	3,839,400	99,700
Brazil	335,400	7,900	5,200,300	151,601
South and Central America (except Brazil)	26,400	595	170,000	4,666
West Africa				
French West and Equatorial Africa	....	....	278,600	7,883
Gold Coast	24,300	433	391,200	10,073
Other parts of West Africa	94,300	1,524	1,722,700	45,769
East Africa, including Madagascar	109,800	2,133	707,800	18,332
Other countries	162,300	4,749	2,337,900	74,978
Totals	32,906,900	£626,714	391,284,800	£10,279,324
Gutta percha and balata	397,700	34,187	4,607,300	343,032
Waste and reclaimed rubber	584,300	5,869	8,835,500	102,931
Rubber substitutes	15,600	374	137,200	2,896
Totals	33,904,500	£667,144	404,864,800	£10,728,183
Manufactured				
*Tires and tubes				
Pneumatic				
Outer covers	....	£13,350	....	£328,670
Inner tubes	....	4,530	....	63,457
Solid tires	....	3,204	....	43,376
Boots and shoes....*doz. pairs*	51,139	130,729	1,243,405	1,719,419
Other rubber manufactures	....	172,353	....	2,207,744
Totals	....	£324,166	....	£4,362,666

Exports

	Pounds	Value	Pounds	Value
Unmanufactured				
Waste and reclaimed rubber	1,504,300	£11,681	20,839,500	£162,497
Rubber substitutes	44,800	927	582,100	12,103
Totals	1,549,100	£12,608	21,421,600	£174,600
Manufactured				
Tires and tubes				
Pneumatic				
Outer covers	....	£235,600	....	£3,837,118
Inner tubes	....	25,024	....	544,100
Solid tires	....	4,895	....	88,284
Boots and shoes....*doz. pairs*	13,805	25,473	256,876	381,399
Other rubber manufactures	....	160,797	....	2,449,189
Totals	....	£451,789	....	£7,300,090

Exports—Colonial and Foreign

	Pounds	Value	Pounds	Value
Unmanufactured				
Crude rubber To—				
Soviet Union (Russia)	895,500	£28,394	17,054,600	£623,380
Sweden, Norway, and Denmark	201,500	5,969	2,546,700	90,788
Germany	1,311,700	24,051	26,969,500	806,702
Belgium	206,500	5,301	7,697,500	247,612
France	1,788,500	45,536	51,712,000	1,244,452
Spain	101,900	3,680	1,026,200	43,307
Italy	336,100	8,758	5,059,900	140,787
Other countries in Europe	394,600	10,717	4,894,000	177,983
United States	105,300	2,886	3,770,800	107,147
Canada	2,500	105	2,500	105
Other countries	125,700	3,970	1,598,600	63,111
Totals	5,469,800	£139,367	122,332,300	£3,545,374
Gutta percha and balata	32,800	3,245	609,400	51,970
Waste and reclaimed rubber	1,500	34	121,400	2,164
Rubber substitutes	....	....	2,900	60
Totals	5,504,100	£142,646	123,066,000	£3,599,568
Manufactured				
Tires and tubes				
Pneumatic				
Outer covers	....	£3,493	....	£65,694
Inner tubes	....	463	....	7,485
Solid tires	....	17	....	272
Boots and shoes....*doz. pairs*	1,079	2,703	24,236	45,871
Other rubber manufactures	....	4,856	....	72,153
Totals	....	£11,532	....	£191,475

*Motor cars, motorcycles, parts and accessories, liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts, and accessories were exempt from duty until Apr. 30, 1926, inclusive, and tires and tubes until Apr. 11, 1927, inclusive.

Component Parts of a Tire

The number of automobile casings produced in 1929 was reported by the Census Bureau as 68,807,118. The average total consumption for all purposes of various materials by the tire industry, per casing produced, figures out: crude rubber, 12.28 pounds; reclaimed rubber, 3.66 pounds; carbon black, 2.10 pounds; zinc oxide, 1.55 pounds; sulphur, 0.60 pounds; tire fabrics, 3.88 pounds. Rubber Division, Department of Commerce, Washington, D. C.

Rubber Goods Production Statistics

	1930			1929			1928			Cumulative Total from Jan. 1 through Dec. 31		
TIRES AND TUBES	Oct.	Nov.	Dec.	Oct.	Nov.	Dec.	Oct.	Nov.	Dec.	1930	1929	1928
Pneumatic casings												
Production .... *thousands*	2,866	2,123	2,251	3,689	2,703	2,446	5,495	4,556	4,204	40,772	54,981	58,539
Stocks, end of month .... *thousands*	7,842	7,676	7,203	9,633	9,701	9,470	8,640	9,434	10,218	....	....	....
Shipments												
Domestic .... *thousands*	2,613	2,119	2,550	3,520	2,500	2,448	4,096	3,539	3,201	40,828	53,178	53,781
Export .... *thousands*	186	148	139	199	168	142	191	209	242	2,085	2,335	2,022
Inner tubes												
Production .... *thousands*	3,161	2,144	2,448	4,000	2,835	2,787	5,197	4,198	3,888	41,935	55,063	60,175
Stocks, end of month .... *thousands*	8,414	8,250	7,999	10,242	10,276	10,245	11,464	11,820	12,087	....	....	....
Shipments												
Domestic .... *thousands*	2,659	2,147	2,634	3,629	2,679	2,620	4,138	3,618	3,466	42,646	54,967	56,574
Export .... *thousands*	119	84	96	122	105	103	108	133	178	1,306	1,506	1,315
Solid and cushion												
Production .... *thousands*	18	13	13	35	31	28	47	36	32	204	410	514
Stocks, end of month .... *thousands*	78	76	76	111	117	122	153	151	152	....	....	....
Shipments												
Domestic .... *thousands*	19	13	12	34	23	19	43	34	28	232	406	478
Export .... *thousands*	1	1	1	2	2	2	3	3	3	17	28	43
OTHER RUBBER PRODUCTS												
Rubber-proofed fabrics, production												
Total .... *thous. of yds.*	5,209	2,822	....	6,118	4,395	2,291	5,914	4,173	2,348	*40,772	*48,442	*39,121
Auto fabrics .... *thous. of yds.*	915	532	....	778	540	488	609	701	567	*9,502	*10,385	*8,524
All other .... *thous. of yds.*	1,254	864	....	1,720	1,308	882	1,296	1,025	797	*11,580	*14,483	*9,949
Raincoat fabrics .... *thous. of yds.*	3,040	1,426	....	3,618	2,547	921	4,009	2,447	984	*19,690	*23,572	*20,648
Rubber heels												
Production .... *thous. of pairs*	16,466	11,083	....	22,386	17,863	14,781	21,932	18,686	15,811	*164,959	*217,345	*219,359
Shipments												
To shoe manufacturers .... *thous. of pairs*	9,354	4,578	....	13,746	11,653	8,639	9,813	8,602	7,321	*98,861	*135,474	*109,707
To repair trade .... *thous. of pairs*	8,291	4,473	....	7,994	6,571	4,148	9,580	7,921	5,586	*64,974	*80,623	*88,545
For export .... *thous. of pairs*	966	880	....	920	801	956	1,262	1,317	1,108	*10,384	*11,429	*10,296
Stocks, end of month .... *thous. of pairs*	29,353	29,130	....	42,109	41,286	41,544	50,111	48,691	50,903	....	....	....
Rubber soles												
Production .... *thous. of pairs*	3,056	1,426	....	3,502	3,400	3,003	2,297	2,649	2,771	*26,493	*31,496	*34,874
Shipments												
To shoe manufacturers .... *thous. of pairs*	2,638	1,011	....	2,691	2,676	2,372	1,655	1,906	1,730	*22,428	*24,998	*20,748
To repair trade .... *thous. of pairs*	492	280	....	647	576	449	958	885	805	*4,097	*6,622	*10,185
For export .... *thous. of pairs*	82	60	....	90	109	88	328	63	143	*658	*680	*2,309
Stocks, end of month .... *thous. of pairs*	2,520	2,390	....	3,443	3,421	3,545	5,212	4,723	4,534	....	....	....
Mechanical rubber goods, shipments												
Total .... *thous. of dolls.*	4,186	3,400	....	5,887	4,932	4,751	5,837	5,201	5,271	*55,127	*70,019	*63,833
Belting .... *thous. of dolls.*	954	779	....	1,477	1,203	1,086	1,387	1,203	1,198	*13,057	*17,098	*15,680
Hose .... *thous. of dolls.*	1,554	1,276	....	2,135	1,830	1,895	2,026	1,811	1,964	*22,060	*25,893	*23,609
All other .... *thous. of dolls.*	1,678	1,345	....	2,274	1,899	1,770	2,424	2,186	2,109	*20,008	*27,028	*24,562
Rubber bands, shipments .... *thous. of lbs.*	197	165	165	216	170	189	216	201	188	2,327	*2,333	*2,136
Rubber flooring, shipments .... *thous. of sq. ft.*	682	432	....	543	517	618	559	566	623	*6,050	*6,161	*6,385
Calendered rubber clothing												
Production .... *no. coats and sundries*	41,291	22,623	20,791	99,588	75,392	49,093	106,005	93,080	76,014	623,678	978,793	1,187,438
Net orders .... *no. coats and sundries*	25,082	15,493	12,881	76,194	95,423	16,095	75,482	45,876	36,363	538,384	711,075	791,277

* Cumulative through Nov. 30.
Source: *Survey of Current Business*, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Tire Production Statistics

	High Pressure Pneumatic Casings					
	All Types			Cord		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1928	**10,217,708**	**58,457,873**	**55,721,937**	**3,580,576**	**19,302,218**	**19,351,380**
1929	**9,470,368**	**54,980,672**	**55,515,884**	**2,290,236**	**13,765,025**	**15,016,460**
1930						
January ..	**9,539,353**	**3,588,862**	**3,525,404**	**2,382,959**	**804,783**	**713,713**
February ..	**9,928,838**	**3,644,606**	**3,356,104**	**2,474,495**	**662,419**	**599,599**
March ...	**10,010,173**	**3,890,981**	**3,773,865**	**2,458,117**	**572,417**	**588,613**
April	**10,461,208**	**4,518,034**	**4,071,822**	**2,493,603**	**656,281**	**610,308**
May	**10,745,389**	**4,573,895**	**4,173,177**	**2,421,953**	**618,012**	**677,999**
June	10,621,634	4,097,808	4,234,994	2,258,517	584,089	748,203
July	**9,449,318**	**3,193,057**	**4,357,836**	**1,835,760**	**425,844**	**845,072**
August ...	**8,678,164**	**3,332,489**	**4,139,900**	**1,516,904**	**506,305**	**869,662**
September .	**7,849,411**	**2,692,355**	**3,524,141**	**1,285,619**	**521,835**	**759,366**
October ..	**7,842,150**	**2,865,933**	**2,799,440**	**1,290,536**	**617,713**	**616,919**
November..	7,675,786	2,123,089	2,267,465	1,279,867	441,443	450,458
December..	7,202,750	2,251,269	2,688,960	1,261,699	438,444	467,073

	Balloon Casings			Solid and Cushion Tires		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1928	6,594,978	38,878,218	35,931,982	152,120	508,223	512,602
1929	7,160,127	41,128,577	40,377,781	122,200	409,344	427,779
1930						
January	7,139,154	2,779,864	2,805,740	126,784	25,049	21,476
February ..	7,436,247	2,975,922	2,750,324	127,793	22,302	21,005
March	7,535,468	3,311,978	3,177,634	123,179	19,329	23,951
April	7,951,317	3,854,540	3,454,171	116,595	17,335	24,232
May	8,323,436	3,955,883	3,495,178	108,055	16,752	24,426
June	8,363,087	3,513,719	3,486,791	106,589	16,612	19,613
July	7,613,558	2,767,213	3,512,764	100,930	12,893	20,545
August ...	7,161,260	2,796,184	3,270,238	90,245	16,064	23,519
September .	6,563,792	2,170,520	2,764,775	81,692	14,361	23,318
October ...	6,551,614	2,248,220	2,182,521	78,322	17,567	20,309
November .	6,395,919	1,681,646	1,817,007	76,155	13,010	14,676
December.	5,941,051	1,812,825	2,221,887	75,871	13,006	13,565

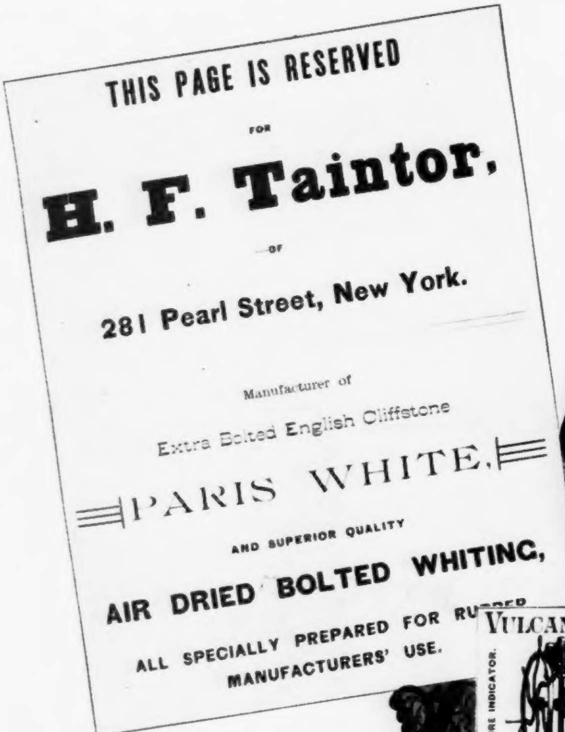
	High Pressure Inner Tubes			Balloon Inner Tubes		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1928	**5,037,716**	**23,255,891**	**23,749,966**	**7,049,748**	**36,878,990**	**34,095,223**
1929	**3,339,451**	**16,100,281**	**17,718,806**	**6,889,213**	**38,921,749**	**38,719,177**
1930						
January ..	**3,233,813**	783,709	889,208	6,911,422	**2,898,682**	**2,992,752**
February ..	**3,243,130**	675,126	680,989	7,171,395	**3,030,745**	**2,786,578**
March ...	**3,137,472**	619,416	696,161	7,392,794	**3,331,739**	**3,082,456**
April	**3,144,558**	678,152	674,032	7,871,181	**3,728,177**	**3,202,261**
May	**2,983,388**	683,236	769,463	8,098,115	**3,745,131**	**3,289,384**
June	**2,781,524**	641,508	914,909	8,107,920	**3,318,464**	**3,297,573**
July	**2,098,130**	634,751	1,252,806	7,227,472	**2,516,356**	**3,431,376**
August ...	**1,853,988**	1,084,265	1,335,284	6,735,316	**2,752,615**	**3,274,572**
September .	1,715,202	913,190	1,047,783	6,336,919	2,140,234	**2,584,675**
October ...	1,900,435	955,127	754,595	6,513,143	2,205,921	2,023,370
November..	1,970,281	603,543	514,090	6,280,151	1,540,066	1,716,564
December..	2,026,699	578,890	563,415	5,972,778	1,869,305	2,166,558

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		Consumption of Motor Gasoline (100%) Gallons
	Cotton Fabric Pounds	Crude Rubber Pounds	
1928	222,243,398	600,423,401	13,633,452,000
1929	208,824,653	583,039,984	14,748,552,000
1930			
January	14,559,163	42,108,149	1,080,660,000
February	13,766,977	40,378,929	1,060,640,000
March	14,655,987	43,910,926	1,241,240,000
April	17,263,963	51,151,863	1,382,400,000
May	17,436,928	52,130,471	1,459,880,000
June	15,034,336	45,705,967	1,508,220,000
July	13,399,389	39,365,247	1,533,880,000
August	13,222,934	40,735,541	1,497,920,000
September	10,916,524	33,382,031	1,513,200,000
October	11,780,432	36,097,115	1,355,214,000
November	8,417,845	26,252,716	1,301,580,000
December	8,357,984	25,536,752	1,164,360,000

Rubber Manufacturers Association figures representing 80 per cent of the industry since January, 1929, with the exception of gasoline consumption.

Forty Years Ago

The Following Advertisements and News Items Appeared in The "India Rubber World and Electrical Trades Review," Vol. 1 and 2, 1889-1890



A NEW feature in the shipment of chalk to this country is the loading of steamers with it in the place of sailing vessels. At the H. F. Taintor works at Long Island City, there is discharging at the present time a steamer 285 feet long that brought over 2,350 tons of chalk, which is one of the largest single shipments ever made.

The Home Rubber Co., of Trenton, N. J., although not by any means the noisiest of the rubber manufacturers, seem to be getting there in substantial shape. They are about to put in a new two-hundred horse-power engine, and to double their present number of mixing mills. As they have just added several presses, and various plates for corrugated matting, it will be seen that their new plant is most complete.

The accompanying cut represents the knuckle-joint vulcanizing press made by the Boomer & Boschert Press Co., of Syracuse, N. Y. It is particularly well adapted for mould work, as the pressure, although very great, is easily applied, requiring no hammering of hand-wheels to do even the heaviest work. For light work or for soft metal moulds, the indicator showing the pressure applied is invaluable. This press is made in various sizes with plates ranging from 12 x 14 inches, to 66 x 72 inches, and with two, three, or more steam plates.

The accompanying engraving . . . shows a tubing machine made by Messrs. John Royle & Sons, Paterson, N. J. This is an excellent machine for rubber and other manufacturers who use materials that become plastic when heated. It is well adapted for making all sizes of plain and corrugated seamless tubing, solid cord, or rod, and various odd shapes in soft rubber, hard rubber, celluloid and other kindred compounds. Also for insulating wire, used in electrical and similar appliances.

Mr. H. F. Taintor, the well-known whiting man, is spending this month at his summering place on the Rhode Island shore, Mr. Angell, his right hand man, putting off his vacation until September, when he expects to put in several weeks at his favorite occupation, which is fishing.

The Home Rubber Co., of Trenton, N. J., are contemplating quite an extension to their plant, as they find it impossible, running overtime, to fill their orders.

The Boomer & Boschert Press Co., Syracuse, N. Y., write us under date of the 7th inst.: "The Cleveland Rubber Co., have ordered a 44 x 72 double cylinder hydraulic press."

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